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A CRITICAL SURVEY OF THE ANATOMY OF THE FEMALE PELVIS BASED ON SECTIONS AND DISSECTIONS OF A SERIES OF SIXTEEN FEMALE PELVES.[1]

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(*Continued from page* 192.)

KEY TO NUMBERS USED IN PHOTOGRAPHS.

NOTE.—The same number is allotted to each structure throughout the series of figures.

Bones—

1. Great wing of ilium.
2. Body of ilium.
3. "Quadrate mass" of bone forming the lateral wall of the pelvis.
4. Acetabulum.
5. Femur.
6. Ischium.
7. Tuberosity of ischium.
8. Spine of ischium.
9. Inferior ramus of ischium.
10. Ischio-pubic rami.
11. Body of pubis.
12. Superior ramus of pubis.
13. Inferior ramus of pubis.
14. Sacrum.
15. Coccyx.

Foramina—

16. Obturator foramen.
17. Greater sciatic foramen.
18. Lesser sciatic foramen.

Joints—

19. *Symphysis pubis.*
20. Sacro-iliac joint.
21. Hip joint.

Ligaments—

22. Arcuate ligament.
23. Sacro-tuberous ligament.
24. Sacro-spinous ligament.

Muscles—

25. *Gluteus maximus.*
26. *Pyriformis.*
27. Psoas.
28. *Iliacus.*
29. *Obturator internus.*
30. *Levator ani.*
31. *Coccygeus.*
32. External *sphincter ani.*
33. Internal *sphincter ani.*

[1]Being a thesis submitted for the degree of doctor of medicine, University of Sydney.

34. Transverse perineal muscle.
35. *Sphincter urethræ.*
36. Anterior wall of abdomen.

Fasciæ, et cetera—

37. Fascia of *obturator internus.*
38. Fascia of *levator ani.*
39. Anal fascia.
40. *Arcus tendineus* of pelvic fascia.
41. *Lamina terminalis.*
42. Alcock's canal (*fascia lunata*).
43. Periosteum of ischio-pubic rami.
44. Recto-vaginal septum.
45. Pelvic fascia lining rectal channel.
46. Inferior fascia of uro-genital diaphragm.
47. Superior fascia of uro-genital diaphragm.
48. Fascia of *pyriformis* muscle.
49. Obturator membrane.
50. Cave of Retzius (retropubic space).

Blood Vessels—

51. External iliac artery.
51*a*. External iliac vein.
52. Hypogastric artery.
53. Hypogastric vein.
53*a*. Hypogastric group of vessels.
54. Common iliac vein.
55. Obliterated hypogastric artery.
56. Uterine artery.
56*a*. Uterine vessels.
57. Vesical artery.
58. Middle hæmorrhoidal artery.
59. Internal pudendal artery.
60. Inferior hæmorrhoidal vessels.
61. Obturator artery.
62. Vaginal artery.
63. Ovarian vessels.
64. Common iliac artery.

Nerves—

65. Sacral nerve trunks.
66. Obturator nerve.
67. Internal pudendal nerve.
68. Great sciatic nerve.

Viscera—

69. Bladder.
70. Base of bladder.
71. Lateral angle of bladder.
72. Urethra.
73. Urethral orifice.
74. Uterus.
75. *Cervix uteri.*
76. Ovary.
77. Uterine tube.
78. Vagina.
79. Vaginal orifice.
80. Ureter.
81. Rectum.
82. Rectal valve.
83. Anal canal.
84. Anus.
85. Pelvic colon.

Peritoneum—

86. Peritoneal cavity.
87. Peritoneum.
88. Utero-vesical fossa.
89. Pouch of Douglas.
90. Utero-sacral fold.
91. Infundibulo-pelvic fold.
92. Ovarico-uterine ligament.
93. Round ligament.
94. Broad ligament.
95. Utero-sacral ligament.
95*a*. Mesovarium.
95*b*. Mesosalpinx.

Pelvic Connective Tissue—

96. Parametrium.
97. Connective tissue sheets suspending rectum from wall of pelvis.
98. Pelvic connective tissue.
99. Lymph glands.

Perineal Structures—

100. Urogenital diaphragm.
101. Perineal body.
102. Ischio-rectal fossa.
103. Crus of clitoris.
104. Body of clitoris.
105. *Glans clitoridis.*
106. *Pars intermedia* of clitoris.
107. *Mons pubis.*
108. *Labium majus.*
109. *Labium minus.*
110. Vestibule.
111. *Rima pudendi.*
112. Bulb of vestibule.
113. Ano-coccygeal *raphé.*
114. Natal cleft.

R. Right side of body.
L. Left side of body.

Pelvis I.

Pelvis cut in a series of horizontal sections.

The pelvis is that of a female Australian aborigine. It was cut in a series of thirteen horizontal sections under the direction of Professor J. T. Wilson. The sections are about twelve millimetres in thickness. The planes of section refer to the superior surface of each section; thus 1 means the superior surface of Section 1.

Section 1 is above the plane of the *pelvis major.*

Section 2 passes through the great wing of the ilium and the body of the fifth lumbar vertebra.

Section 3 passes above the anterior superior iliac spine, through the intervertebral disc between the fifth lumbar vertebra and the first sacral vertebra and through the sacro-iliac joints. The psoas and *iliacus* muscles are cut through. On both sides the common iliac artery has divided into the external iliac and hypogastric branches. The ureter is directly anterior to the hypogastric artery on both sides. Several large lymphatic glands, members of the external iliac, interiliac and hypogastric lymphatic gland groups, are present in close relation with the vessels. A little to the left of the mid-line the pelvic colon is attached by its mesentery, in which the superior hæmorrhoidal vessels and several small lymphatic glands appear.

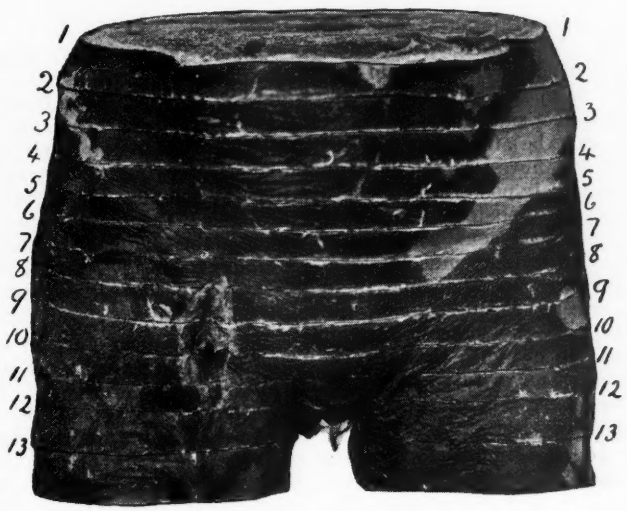
On the right side in front of the ureter the upper pole of the right ovary lies just below the plane of the section which has, however, cut through the right uterine tube. The fimbriated end of this tube lies in the mid-line close to the right side of the pelvic colon. A small hydatid of Morgagni is attached to it in the plane of section. With the hand lens the ovarian vessels may be seen in the substance of the infundibulo-pelvic ligament medial to its attachment to the pelvic wall. The ligament is attached opposite to the large lymphatic gland in front of the external iliac artery. This is the lateral and uppermost attachment of the right broad ligament. The ovarian leash of vessels is five millimetres from the ureter.

Anteriorly the muscles of the abdominal wall are cut in section.

Section 4.—The great wing of the ilium is cut at the anterior superior iliac spine. Posteriorly the section passes through the first piece of the sacrum and the sacro-iliac joints and on the right side through the first anterior sacral foramen. On either

side the *pelvis major* is lined by the ilio-psoas muscle. The external iliac and hypogastric vessels are separating. On the left side a large lymphatic gland lies on either side of the external iliac artery. These are members of the external iliac group of lymphatic glands. The ureters lie anterior to the hypogastric arteries. In the mid-line is the pelvic colon, covered by peritoneum on its anterior and lateral surfaces but attached posteriorly by mesentery.

Inside the peritoneal cavity, lying on either side of the pelvic colon but separated from it, are the ovaries. They are cut in horizontal section. On the left side the ovary is attached by the infundibulo-pelvic ligament between whose layers are the ovarian vessels. The uterine tube arches up over the ovary and is cut in two places, in front of and behind the ovary. In the latter situation the fimbriated ends extend. On the right side the ovary is cut through about its middle and is attached by the mesovarium. The uterine tube is cut also. It lies in front of the hilum of the ovary, attached by the mesosalpinx. A large vein, one of the constituents of the pampiniform plexus, appears in the mesovarium close to its junction with the mesosalpinx.



PELVIS I.—PLANE OF SECTIONS.

Section 5. — The plane of section passes through the anterior inferior iliac spine, the third piece of the sacrum and the lower part of the sacro-iliac joint. The plane of section is a little lower on the right side than the left.

In the extraperitoneal tissue on both sides large lymphatic glands lie along the course of the external iliac vessels, members of the external iliac groups of lymphatic glands. They are much larger than normal. The external iliac and hypogastric vessels are widely separated. The former are approaching the anterior abdominal wall. The hypogastric vessels are anterior to the sacro-iliac joints in the postero-lateral quadrants of the pelvis, separated from them by the fibres of the *pyriformis* muscle. These vessels are breaking up into their numerous branches, particularly on the left side. The ureters are immediately under the peritoneum. They are antero-medial to the anterior division of the hypogastric artery.

The peritoneal cavity is subdivided into two compartments by the broad ligaments and the uterus. The uterus appears in the section for the first time in the series. The section passes through the upper part of the body of the uterus almost at the cornua. On the right side the right uterine tube is cut horizontally for about fifteen millimetres. About six millimetres behind and below its junction with the body of the uterus is the right ovarico-uterine ligament, attached medially to the body of the uterus and laterally to the lower pole of the right ovary which is just included in the section. Tracing the ovary forward the mesovarium is seen forming a junction with the mesosalpinx, with a large vein at the point of union. Lateral to this the two layers of the broad ligament pass out for three millimetres and then separate on the pelvic wall.

From the left margin of the body of the uterus the broad ligament runs laterally. At about twenty millimetres from the uterus the left uterine tube and left ovary are cut in section. Beyond this the broad ligament is continued out to the pelvic wall where its layers again separate.

The cavity of the uterus forms a transverse slit. The posterior wall is thicker and more rounded than the anterior wall.

Behind the uterus, a little to the left of the mid-line, the rectum is attached to the anterior surface of the sacrum. It is covered in front and at the sides by peritoneum, while its posterior surface is in contact with the pelvic connective tissue in which may be seen the superior hæmorrhoidal vessels and some small lymphatic glands.

Section 6. — The section passes through the *os coxæ* above the acetabulum. Then on both sides it crosses the upper part of the greater sciatic foramen and posteriorly it passes through the fourth piece of the sacrum.

The *os coxæ* is clothed laterally by the *gluteus minimus* muscle. On the medial surface each bone has two muscles in contact with it, the ilio-psoas is anterior, while behind it the *obturator internus*, clothed by its fascia, is passing up to the ilio-pectineal line. The strong fascia of the *obturator internus* is continuous on both sides with that covering the *pyriformis*. The *nervus ischiadicus* lies in a compartment of its own behind this fascia. Medial to the nerve the hypogastric vessels are grouped, as at this level they have subdivided into several smaller branches. They lie almost immediately under the peritoneum. The ureter is immediately under the peritoneum where the posterior layer of the broad ligament is passing back on to the pelvic wall. The external iliac vessels lie medial to the

ilio-psoas. Large lymphatic glands of the external iliac group lie in front of and behind them. Posteriorly the rectum lies a little to the left of the mid-line in relation to the front of the sacrum and the left *pyriformis* muscle. It is covered with peritoneum on its anterior aspect only.

Running across the pelvis opposite and between the "quadrate mass" of the ilium are the broad ligaments. They are attached to the body of the uterus which is cut transversely about its middle. The anterior and posterior walls of the uterus are about equal in thickness and curvature. Along its lateral margins the uterine vessels are coursing. Here it is in direct relation with the parametrium. The peritoneum is continuous from one side of the pelvis to the other, clothing the front and back of the broad ligaments and the uterus.

Section 7.—The plane of section passes through the ilium above the acetabulum on the left side and through its upper part on the right side. The lateral bony wall of the pelvis consists of the quadrate mass of the *os coxæ*. Clothing this surface is the *obturator internus* muscle. The *nervus ischiadicus* is related to its posterior border. In the mid-line posteriorly is the lower segment of the sacrum. From its lateral margins the sacro-tuberous and sacro-spinous ligaments can be traced for about twenty-five millimetres. The fibres of the *gluteus maximus* muscle arise from their posterior surfaces. Between these ligaments and the posterior border of the ilium is the greater sciatic foramen. The section is above the level of the *levator ani* muscle. The strong fascia of the *obturator internus* appears to be continuous with a strong sheet covering the sacro-tuberous ligaments and the sacrum, except where the vessels are passing out into the buttock. They carry tubular prolongations of this fascia with them. Medial to this fascia are several thin layers of extra-peritoneal connective tissue.

The peritoneal cavity is again subdivided into a large anterior compartment and a small posterior space by the broad ligaments and the uterus. The section passes through the upper part of the *cervix uteri* which has walls of equal thickness. The broad ligaments are thick and contain much parametric tissue. The right ureter lies close to the anterior layer of the right broad ligament about fifteen millimetres from the lateral border of the cervix. On the left side the ureter is similarly situated, but about twenty millimetres from the cervix.

The rectum lies a little to the left of the mid-line in front of the sacrum and the left sacro-tuberous ligament. It is covered anteriorly by peritoneum.

Section 8.—The section passes just above the upper border of the pubes, through the acetabulum on each side, through the tip of the spine of the ischium on the right side and through the upper part of the base of the spine of the ischium on the left side and through the coccyx posteriorly.

Anteriorly the lower tendinous part of the abdominal wall is cut through. Laterally the quadrate mass of the *os coxæ* forms the boundary of the true pelvis. It is clothed by *obturator internus* and its fascia. Tracing the fascia forward it fuses with the periosteum at the margin of the obturator foramen which lies just below the plane of the section. Here the obturator vessels and nerves are in contact with the bone as they pass down to the obturator foramen.

On the right side the tip of the spine of the ischium stands out. Attached to it are the *ligamentum sacro-spinosum* and medial to this the *levator ani* muscle. Both these structures can be traced to the lateral margin of the coccyx. The ligament forms a firm support for the posterior part of the *levator ani* muscle. It is again supported posteriorly for thirty millimetres by the sacro-tuberous ligament. Indeed the two ligaments are fused together to form one structure. From the posterior surface of the ligament the *gluteus maximus* arises for thirty to forty millimetres on each side. The pelvic viscera have a support in this quadrant of the pelvis of a mass of muscle and ligaments from twenty to twenty-five millimetres in thickness consisting from within outwards of *levator ani*, the ligaments and the *gluteus maximus* muscle.

Inside the muscular ring the viscera are cut at various levels. There are two pouches of peritoneum, a large one in front, the utero-vesical pouch, and a small one posteriorly, the pouch of Douglas. In the former the peritoneum descends from the posterior surface of the anterior abdominal wall to line the pelvis. In the mid-line is the ridge of the urachus. The peritoneum covers the superior surface of the bladder. Posteriorly it is carried off the bladder on to the front of the *cervix uteri*. Laterally it forms the lowest part of the anterior layer of the broad ligament.

The lowermost portion of the *cervix uteri* is cut through and the lateral and posterior fornices of the vagina are laid open. The ureters lie in front of the lateral fornix of the vagina being ten millimeters in front on the right side and eight millimetres in front on the left side. Laterally the vagina is related to the parametrium, while posteriorly it is in contact with the peritoneum of the pouch of Douglas on the right and with the rectum on the left.

On either side there is a pad of yellow fat in relation with the fascia of the *obturator internus*. Medial to this is the tissue of the parametrium. This consists of white fibrous tissue in many layers and it is packed closely with vessels. If a line be taken along the posterior vaginal wall and continued outwards and backwards on each side it corresponds to a sheath of connective tissue forming a definite boundary between the parametrium anteriorly and the whitish fat surrounding the rectum posteriorly. This boundary can be traced back round the rectum on both sides. It forms a completely enclosed space within which is the rectum with its modified fat. This is the "rectal channel." The layer of connective tissue limiting this anteriorly is the recto-vaginal septum.

Section 9.—The plane of section passes through the *symphysis pubis* and the bodies of the pubic bones about fifteen millimetres below the highest point of the crest of each pubis. On both sides the

plane passes through the obturator foramen, through the quadrate mass of the *os coxæ*, the lesser sciatic foramen, the sacro-tuberous ligament and the tip of the coccyx.

The *obturator internus* muscle is arising from the posterior part of the back of the pubes, from the obturator foramen and the *os coxæ*. Its fibres are turning round the margin of the lesser sciatic foramen to leave the pelvis. The *levator ani* forms a ring round the pelvic viscera except anteriorly. It arises on the right side from the back of the pubis and is in contact with the medial surface of the fascia of the *obturator internus*. At a point ten millimetres medial to the posterior border of the *os coxæ* its fibres change direction. They dip backwards and inwards towards the coccyx and ano-coccygeal *raphé*.

Within the ring of the pubes, *levatores ani* and coccyx lie the pelvic viscera. The bladder which is cut through its middle, lies in a bed of loose connective tissue except posteriorly where it is related directly to the anterior wall of the vagina. The bladder has a thick muscular wall. Its mucous membrane is thrown into folds.

The vagina lies in close contact with the bladder in front and the rectum behind. There is, however, a definite plane of cleavage between the viscera. This is more distinct posterior to the vagina where the recto-vaginal septum is well defined. Laterally the vagina is related to the loosely packed pelvic connective tissue.

The rectum lies in a separate pouch or compartment formed by the coccyx and *levatores ani* posteriorly and laterally and the vagina anteriorly. It is surrounded by loose areolar and adipose connective tissue.

The viscera here have the appearance of expansile tubes or reservoirs, each loosely packed in pelvic connective tissue and each capable of expansion or of a small degree of mobility almost independent of the others.

Section 10.—The section passes through the lowest part of the bodies of the pubic bones and the *symphysis pubis*, the obturator foramen and the *tuber ischii*. Posteriorly it is below the level of the coccyx. In the mid-line posteriorly twenty-two millimetres from the skin is the ano-coccygeal *raphé*. The *gluteus maximus* muscle bounds the ischio-rectal fossa postero-laterally.

The *obturator internus* clothes the posterior part of the pubes, the obturator membrane and the *os coxæ*. The *levatores ani* arise on the right and left sides from the back of the bodies of the pubes twelve to fourteen millimetres from the mid-line respectively. From this point back to the level of the sides of the vagina the fibres appear to sweep downwards and backwards and are thick and strong. This part of the muscle measures forty millimetres antero-posteriorly and five to seven millimetres in thickness. Behind this point it forms a thin muscular ring closely applied to the rectum and the anal canal.

Immediately behind the symphysis and bodies of the pubes is a small compartment containing fat. It is the lowest limit of the cave of Retzius. Inside the *levatores ani* are the urethra, vagina and rectum and anal canal. The urethral canal is surrounded by a strong circular sphincter. The lateral margins of the sphincter are attached through dense bands of tissue to the back of the pubes on either side at the point of origin of the *levator ani*. The urethra is surrounded by a plexus of blood vessels. The vagina, an H-shaped slit, is loosely attached to the urethra and rectum and has many large vessels along its lateral borders. The anal canal is closely related to the *levator ani* with very little connective tissue between.

Section 11.—The section passes through the posterior part of the inferior ramus of the ischium and the *tuber ischii*. It is below the level of the pubes and coccyx.

Anteriorly between the fascia of the inner sides of the thighs is the fatty tissue of the *labia majora*. The *rima pudendi* is just appearing. On either side, attached to the inferior rami of the ischium, is the *crus clitoridis*, clothed by the ischio-cavernosus muscle. Medial to the crus is the cavernous tissue of the bulb of the vestibule, closely related to the urethra and vagina. Posterior to the attachment of the crus are the lowermost fibres of the *obturator internus*, clothed with its fascia which is forming the lateral boundary of the ischio-rectal fossa.

The urethra, vagina and anal canal are closely related to one another. On both lateral angles of the vagina are a thickening and condensation of connective tissue. The plane of section passes just below the base of the uro-genital diaphragm. This thickened and dense tissue links up the perineal body with the uro-genital diaphragm on either side and serves as an indirect attachment for the perineal body to the bony wall of the pelvis.

Sections 12 and 13 are below the pelvis.

Pelvis II.

The pelvis has been cut in a series of horizontal sections about twenty-five millimetres in thickness. The sections are mounted in series in such a way that one is looking at the inferior surface of each section. The letters R. and L. indicate the right and left sides of the body.

Sections 1 and 2 are above the level of the sacrum and do not include the true pelvis.

Section 3.—The plane of section passes through the first piece of the sacrum, the sacro-iliac articulations, the great wing of the ilium and the muscles of the abdominal wall. The left common iliac artery has divided into its two terminal branches. The external iliac artery lies medial to the psoas muscle with the hypogastric artery twenty millimetres posterior to it. The left ureter has a direct anterior relation to the hypogastric artery, lying immediately beneath the peritoneum. Medial to the ureter and hypogastric artery is a fold of peritoneum containing small vessels; this is the upper part of the infundibulo pelvic fold of peritoneum or the suspensory ligament of the ovary. (Note its close relation to the ureter.)

On the right side the external iliac and hypogastric arteries show a similar arrangement. The right ureter lies in front of and medial to the hypo-

gastric artery. In front of the ureter is the commencement of the right infundibulo-pelvic ligament.

The peritoneal cavity is occupied by coils of small and large intestine.

Section 4.—The plane of section passes through the great wing of the ilium above the anterior inferior iliac spine, the upper part of the greater sciatic foramen and the third piece of the sacrum. The lowest part of the right sacro-iliac joint is opened.

On each side the front of the sacrum is clothed by the *pyriformis* muscle. The posterior surface of the rectum is in relation to the right *pyriformis* muscle, separated, however, by a sheet of connective tissue. Anterior to the *pyriformis* on each side the various terminal branches of the hypogastric artery and the sacral nerves form a series of neuro-vascular bundles. On the medial surface of this neuro-vascular area and lying immediately under the peritoneum is the ureter. On tracing the peritoneum over the ureter forward for about twenty millimetres on both sides the attachment of the broad ligament is found. On the left side the layers of the broad ligament are in close contact for twenty millimetres from the pelvic wall, where they separate and the mesosalpinx and mesovarium are seen. The former is posterior and the uterine tube is lying on the lateral surface of the ovary. In the mesovarium the ovarian leash of vessels and nerves is coursing in close relation to the hilum of the ovary which is cut in section.

On the right side a similar arrangement can be made out. The uterine tube is lying between the ovary and the ureter and in close relation with each.

The ilio-psoas muscle lines the wing of the ilium with the external iliac artery on its medial surface. The pelvic cavity contains small and large bowel. The *appendix vermiformis* descends into the pelvis. It is coiled on itself, lying in front of the right broad ligament and medial to the psoas muscle.

Section 5.—The plane of section passes through the muscles of the anterior abdominal wall about twenty-five millimetres above the pubes, through the *os coxæ* opposite the anterior superior iliac spine, through the ilio-pectineal line opposite the upper part of the quadrate mass of bone, through the lower part of the greater sciatic foramen and through the fifth piece of the sacrum.

The *os coxæ* bears two muscles on its medial surface; in front of the ilio-pectineal line is the ilio-psoas, below and behind the ilio-pectineal line is the upper part of the *obturator internus*. Behind the bone the lower part of the greater sciatic foramen contains the *nervus ischiadicus*, while a few fibres of the *pyriformis* appear on the right side. The lower fibres of the sacro-tuberous and sacro-spinous ligaments are cut for forty millimetres on either side of the sacrum. The *gluteus maximus* arises from the posterior surface of the bone and the ligaments.

The pelvic cavity is divided into two compartments by the broad ligaments and the uterus. The anterior compartment which is much the larger, contains coils of small and large bowel. The posterior compartment is merely a slit, representing the retro-uterine pouch (of Douglas).

The uterus lies twenty millimetres to the left of the mid-line. It is cut through the lower part of the body. The uterine cavity is a narrow slit, while the walls are equally thick and curved. Owing to the lateral displacement of the uterus the broad ligaments have a different configuration. On the left side the broad ligament is short and wide, being ten millimetres in length while its layers are fifteen millimetres apart. The uterine vessels are close to the side of the uterus. The ureter is directly under the peritoneum just in front of the point where the anterior layer of the broad ligament is reflected on to the wall of the pelvis. It is seventeen millimetres from the side of the uterus.

On the right side the broad ligament is sixty millimetres in length. Near the uterus it is thin and the layers lie close together. The ureter lies under the anterior layer, but not immediately under the peritoneum. It is forty millimetres from the side of the uterus. At the side of the pelvis the layers are twenty millimetres apart.

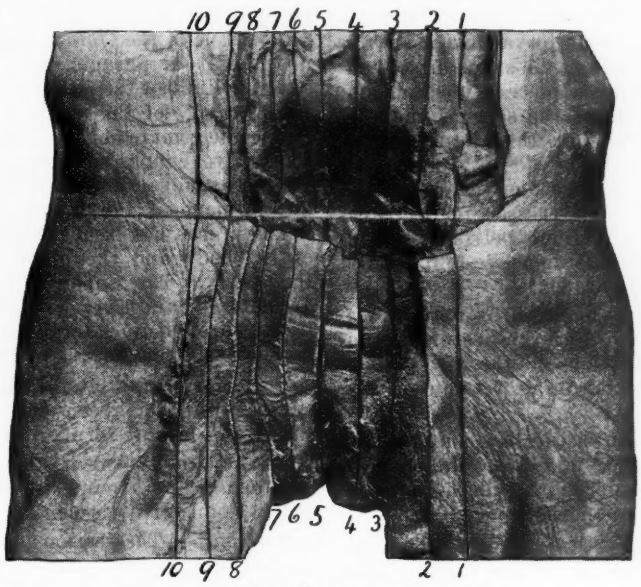
Behind the pouch of Douglas the rectum is in relation with the anterior surface of the sacrum. The bowel is surrounded by loose connective tissue. This is bounded in turn by layers of white fibrous tissue which form the walls of the compartment, the "rectal channel."

Section 6.—The plane of section passes through the acetabulum on both sides. The head of the femur is cut in section. The *os coxæ* is cut at a plane just above the spine of the ischium. Anteriorly the plane of section just clears the pubes while posteriorly it passes through the coccyx. The sacro-tuberous and sacro-spinous ligaments both appear in the plane of section. The *obturator internus* muscle clothes the medial surface of the *os coxæ*. The plane of section is along the upper border of the *levator ani* as it passes from the tip of the spine of the ischium to the side of the coccyx. The muscle is lining the anterior surface of the sacro-spinous ligament. The anterior two-thirds of the pelvis is occupied by omentum and coils of bowel. The vagina with the base of the broad ligament on each side bridges across the pelvis posteriorly. The vagina lies to the left of the mid-line. The right ureter is in the substance of the broad ligament ten millimetres from the lateral wall of the vagina. The left ureter is lying in front of the left fornix of the vagina and only four millimetres from the vaginal wall. The wall of the vagina is thick and dense. The vaginal blood vessels are closely related to its lateral borders on both sides. The rectum occupies the posterior part of the pelvis. It lies on the anterior aspect of the coccyx and the sacro-spinous ligaments. The recto-vaginal septum can be traced on both sides out to the pelvic wall. There is a layer of finely meshed fatty tissue in immediate contact with the wall of the rectum on either side.

Section 7.—The plane of section passes through the lower part of the pubes anteriorly and through the bodies of the *ischia* laterally. Between these is the obturator foramen closed by the obturator

membrane. The obturator membrane bears the *obturator internus* muscle on its medial aspect. The *levator ani* muscle rises from the back of the pubis twenty-five millimetres from the *symphysis pubis*. There is an interval of forty millimetres between the margins of the two *levatores ani muscles*. From these origins the fibres sweep back encircling the bladder, vagina and rectum and join behind the bowel. The rectum is in this section just at the level of commencement of the anal canal and the sphincter muscles are appearing in its walls. The base of the bladder is cut through just below the vesical orifice of the urethra and the commencement of the urethra lies eight millimetres anterior to the lumen of the vagina. The vagina is about thirty-five millimetres in width. The plane of section is above the level of the uro-genital diaphragm.

Section 8. — The plane of section passes through the inferior rami of the pubis and ischium throughout a length of about forty millimetres on either side. This takes off the lowermost limit of each of the rami on each side at a point just in front of the *tuber ischii* and about eight to ten millimetres below the *symphysis pubis*. Anteriorly the *mons pubis* is cut through. The crura of the clitoris are just meeting in the mid-line anteriorly to form the body of the clitoris. The vestibule of the vagina is cut through at the level of both urethral and vaginal orifices. On either side the vagina and urethra are embraced by the bulb of the vestibule while postero-laterally a few loculi of the glands of Bartholin are exposed. Posteriorly the section just includes a few fibres of the external *sphincter ani*. The mass of tissue in this region represents a portion of the perineal body. The plane of section is inferior to the uro-genital diaphragm. It passes through the superficial perineal pouch.



PELVIS III.—PLANE OF SECTIONS.

Pelvis III.

Pelvis cut in a series of sagittal sections.

The pelvic measurements are:

Interspinous	250 millimetres.
Intercristal	275 millimetres.
Intertrochanteric	300 millimetres.

The pelvis was frozen and sawn into a series of sagittal sections which average fifteen millimetres in thickness. There are ten planes of section. These are numbered 1 to 10 from left to right. Sections 1, 9 and 10 do not enter into the true pelvis. Sections 2 to 7 are described.

Section 2.—The plane of section passes through the superior ramus of the left pubis, the obturator canal and the left *os coxæ*, including most of the surface of the quadrate mass of bone between the obturator and sciatic foramina. The *tuber ischii* and sciatic spine are outlined. The section then passes through the greater and lesser sciatic foramen, the ilium, the sacro-iliac joint and a small portion of the ala of the sacrum.

The peritoneum lines the upper and outer part of the pelvic cavity for a small area. Under the peritoneum is the extraperitoneal tissue in which the obturator vessels, cut in longitudinal section, are running to reach the obturator canal. The pelvic fascia lies under the vessels. There is some connective tissue between it and the bone together with some fibres of the *obturator internus*. The internal pudendal artery is curving round the spine of the ischium. In the greater sciatic foramen are the *pyriformis* muscle and the gluteal vessels. The *gluteus maximus* extends from the *dorsum ilii* above to the *tuber ischii* below.

Section 3. — The plane of section passes through the rami of the pubis and the anterior part of the obturator foramen. The obturator membrane is stretched between the margins of the rami. Posteriorly the section passes through the lateral mass of the sacrum and a small part of the great wing of the ilium with a portion of the sacro-iliac joint.

The *obturator internus* muscle is arising from the rami of the pubis and the medial surface of the obturator membrane. It is clothed by obturator fascia. From this the *levator ani* muscle takes origin. The *levator ani* muscle is cut in section from the obturator fascia to the posterior border of the greater sciatic foramen where it is lying on the anterior surface of the sacro-tuberous and sacro-spinous ligaments which are in contact. The muscle shows as a crescentic edge about one hundred millimetres in length. Below it is the fat of the ischio-rectal fossa while the pelvic connective tissue lies on its pelvic surface. The *pyriformis* muscle is arising from the anterior surface of the sacrum.

The pelvic cavity is lined by peritoneum. The mesocolon of the pelvic colon is cut through in the upper part of the pelvis. The outer part of the left uterine tube, forty millimetres in length, runs out and curves down and back over the ovary, which is small and shrunken. The uterine tube is suspended by the infundibulo-pelvic fold of peritoneum from the pelvic wall. The pelvic connective tissue fills the space between the peritoneum and the *levator ani*. Underlying the cut ends of the uterine tube and ovary one may see the ovarian leash of vessels running inwards in the parametrium. Some of the veins are distended with blood clot.

The ureter is running inwards and forwards in the pelvic connective tissue. It is seven millimetres in front of the ovarian leash of vessels and is two millimetres from the peritoneum. The ureter is running down from the posterior abdominal wall in the thickness of this section. A small dissection has been made by removing a piece of peritoneum in front of the upper part of the sacrum and the ureter has been displayed in this position for twenty-five millimetres. It is closely related to the peritoneum. The ovarian leash of vessels is only two millimetres from it and crosses it to reach the pelvis and enter the infundibulo-pelvic fold. The commencement of the infundibulo-pelvic fold is only three millimetres from the ureter.

The ischio-rectal fossa is bounded by the *gluteus maximus* posteriorly and the obturator fascia anteriorly. A small portion of the uro-genital diaphragm is attached to the inferior ramus of the pubis.

Section 4.—The plane of section is about twenty millimetres to the left of the mid-line. The body of the pubis is cut through anteriorly, while the sacrum and coccyx appear in section posteriorly.

The medial end of the *arcus tendineus* can be seen attached to the dorsum of the pubis about twenty millimetres above its lower border.

The *levator ani* muscle arises from the back of the pubes and the white line. The medial part of the muscle is strong, being six to seven millimetres in thickness. These fibres pass directly downwards and backwards parallel with the plane of section, and have a close attachment to the superior surface of the uro-genital diaphragm, joining it twenty millimetres below the pubis. It is in contact with it for another twenty millimetres. From the base of the uro-genital diaphragm the cut edge of the *levator ani* passes back for thirty-five millimetres to the sacro-tuberous and sacro-spinous ligaments to which it lies anterior till it reaches the sacrum and coccyx. The ligaments are thirty millimetres in width below the base which represents the site of the lateral border of the sacrum. The *gluteus maximus* is arising from the posterior surface of the sacro-tuberous ligament and the sacrum.

The uro-genital diaphragm is a thick, dense structure firmly attached to the inferior border of the pubis and extending for forty-two millimetres backwards. It is six millimetres in thickness for eighteen millimetres from the pubis. Behind this point the *levator ani* is intimately related to its superior surface and the two structures are twelve millimetres in thickness. Examination of section 5 shows that at this point the plane of section 4 is only three millimetres lateral to the lumen of the vagina, so that this is the area where the *levator ani* and uro-genital diaphragm are attached to the lateral wall of the vagina. It is twenty millimetres from the margin of the perineum. The uro-genital diaphragm consists of two layers of fascia, superior and inferior, with the transverse perineal muscle and the sphincter of the membranous urethra within them. The crus of the clitoris is attached to the inferior border of the pubic ramus and to the superficial or inferior surface of the uro-genital diaphragm for ten millimetres below the bone. The fatty tissue of the *labium majus* is superficial to the uro-genital diaphragm, while its base forms the anterior limit of the ischio-rectal fossa in this plane.

The cavity of the pelvis is lined by peritoneum. Above the remains of the pelvic mesocolon are seen. The peritoneum is continuous from the back of the pubes to the sacrum, covering the bladder and the lateral part of the uterus.

The uterus has been cut through the lateral part of the body and the plane of section just shows the cervix. The veins of the pampiniform plexus are enlarged and filled with blood clot. The bladder is cut through its lateral part. Below it is firmly bound to the *levator ani* by fibrous tissue.

Posterior to the lateral angle of the bladder the vaginal wall has been cut through at the point where the lateral fornix lies lateral to the cervix.

The spaces between the peritoneum and the *levator ani* and around the viscera are packed with pelvic connective tissue.

Section 5.—The section is slightly to the right of the median sagittal plane. The body of the right pubis is cut just clear of the symphysis. The urethra and the clitoris are included in the thickness of the section and may be seen by looking into the vestibule from below. The vagina, *cervix uteri* and half of the uterus are cut and the section passes through the anal canal and the tip of the coccyx.

Extending from the lower border of the pubis to the vaginal wall is a dense band of tissue twenty-five millimetres long and from four to five millimetres thick, the uro-genital diaphragm. Above it are the lateral wall of the urethra and the base of the bladder, both of which are intimately related to the anterior wall of the vagina. The bladder extends from the front of the *cervix uteri* to the dorsum of the pubes. The cave of Retzius, filled with loose connective tissue, the retropubic pad of fat, lies between the anterior wall of the bladder and the pubes.

The base of the bladder rests on the vagina and the lower part of the *cervix uteri*. Below it is firmly attached to the uro-genital diaphragm by the urethra and its fibrous and muscular surroundings.

The perineal body measures twenty-seven millimetres in length. It lies between the anal canal and the vagina. It extends up between them for twenty-five millimetres. Then the posterior vaginal wall is separated from the rectum by the recto-vaginal septum which has been detached from both viscera.

Posteriorly the *levator ani* descends from the tip of the coccyx to the posterior border of the anal canal where it is firmly attached between the internal and external *sphincter ani*. Anterior to the coccyx and *levator ani* is the pelvic connective tissue. It is bounded by a firm sheet which forms the wall of the rectal channel. It is attached to the anal canal below, while if it is traced proximally it is found to be firmly fixed to the anterior surface of the sacrum and coccyx by a series of fibrous lamellæ. The anal canal is slung from the sacrum and coccyx by this means.

Section 6.—The section varies in thickness, being seventeen millimetres thick anteriorly and six millimetres thick posteriorly. Therefore, the plane of section is a little oblique when compared with the sagittal plane.

The structures in the section include the bladder, uterus, vagina and rectum. The vaginal lumen is opened for twelve millimetres at a point twenty millimetres from the vaginal orifice. Below this point the lateral vaginal wall is in direct relation with the *levator ani* and the uro-genital diaphragm. The plane of section here is about seventeen millimetres from the mid-line, so that it includes only the medial fibres of the *levator ani*. These can be seen arising from the back of the pubis at the junction of its lower and middle thirds. The fibres sweep downwards and backwards and are in contact with the vaginal wall at the point where it is opened, that is about twenty millimetres from the orifice.

The uro-genital diaphragm lies immediately below the *levator ani*. It has a broad, strong attachment to the whole width of the lower border of the inferior pubic ramus. The *crus clitoridis* is attached to its inferior surface, while some veins lie between its layers. Twelve millimetres below the ramus the bulb of the vestibule is attached to its inferior surface. It extends back for about thirty-five millimetres, where its base becomes widened and related to the connective tissue of the ischio-rectal fossa.

Behind the lower point of the vaginal wall the *levator ani* and uro-genital diaphragm become related to the peritoneal body and the external *sphincter ani*. The *levator ani* can then be traced to the coccyx.

Sections 7 and 8 show the general characters exhibited by sections 2 and 3.

Pelvis IV.

Median Sagittal Section of Pelvis.

The pelvis is sawn in median sagittal section. The *symphysis pubis* is divided anteriorly and the sacrum and coccyx posteriorly. The muscles of the anterior abdominal wall are attached to the front of the symphysis. The fibres of the *levator ani* and the ano-coccygeal *raphé* pass from the coccyx to the posterior wall of the anal canal. The perineal body appears between the vagina and anal canal. It measures thirty millimetres from the anal orifice to the vaginal muco-cutaneous junction and fifty-five millimetres from the surface to the point where the rectum and vagina come into relation with one another. The internal and external sphincters of the anus are well developed. They occupy the posterior third of the perineal body. The clitoris is cut in section through part of the body of the organ. It measures thirty-three millimetres in length to the tip of the *glans*. The vascular *pars intermedia* underlies it. The viscera with their canals occupy the rest of the pelvic cavity.

The bladder is in a state of contraction. Its walls, which are thick and muscular, vary in thickness from ten millimetres in front to twenty millimetres above and eight millimetres posteriorly. It is related anteriorly to the back of the pubes, separated by the cave of Retzius. It is covered by peritoneum on its superior surface. Posteriorly the bladder is in direct contact with the front of the cervix and the upper twelve millimetres of the anterior vaginal wall.

The urethra is curved with the concavity directed forwards. It is forty millimetres in length. The urethral walls are thick and strong, averaging five millimetres both in front of and behind the lumen. The lumen of the urethra is about ten millimetres from the inferior margin of the symphysis. The posterior wall of the urethra is related to the anterior wall of the vagina throughout its length. The distance between the lumen of each canal varies from fifteen millimetres at the external orifices to ten millimetres in the middle and fifteen millimetres at the vesical orifice of the urethra.

The vagina slopes upwards and backwards at an angle of about 60° with the horizontal. It is parallel with the brim of the pelvis. In length it is sixty-eight millimetres from the top of the posterior fornix to the vaginal orifice. The *cervix uteri* occupies seventeen millimetres of the upper and anterior part of the vaginal lumen, so that the anterior wall of the vagina measures fifty-one millimetres and the posterior wall sixty-eight millimetres in length. The vaginal walls are two to three millimetres in thickness and lie in close apposition. Anteriorly it is related throughout its whole length to the base of the bladder and the urethra. Posteriorly it lies on the perineal body for twenty millimetres; then it is related to the anterior wall of the rectum and in its highest part, the posterior fornix, to the peritoneum of the bottom of the pouch of Douglas. The recto-vaginal septum can be seen between the rectal and vaginal walls throughout the greater part of their extent, but better in the lower two-thirds.

The rectum and anal canal occupy the posterior part of the pelvis. The anal canal is about forty

millimetres in length. It is related to the perineal body anteriorly and is surrounded by its sphincters. The rectum runs parallel with the vagina. It is partly dilated. Two rectal valves are visible. Its walls are thin, from two to three millimetres. It is related to the vagina and peritoneum anteriorly, while posteriorly it rests on the coccyx and below this on the *levator ani* and the ano-coccygeal *raphé*. The recto-vaginal septum can be seen between the rectum and vagina, while sheets of fascia can be traced between the wall of the bowel and the *levator ani* posteriorly.

PELVIS V. (FRONT).

Pelvis V.

Series of Sections Cut at Right Angles to the Brim.

The pelvis has been cut in four planes of section. These have been made through the lateral diameters and as far as possible at right angles to the brim of the pelvis. The planes of section are numbered 1 to 4 from the front to the back.

Section 1.—The section is cut obliquely and at a different level on the two sides of the body. Thus from the *symphysis pubis* to the anterior superior iliac spine is fifteen centimetres on both sides of the body. On the right side the section cuts the skin six centimetres from the *symphysis pubis* in the line of the right inguinal ligament and on the left side twelve centimetres from the *symphysis pubis* in the line of the left inguinal ligament. In the mid-line the section is 6·5 centimetres above the symphysis. The line of section therefore is much higher on the surface of the body on the left side.

PELVIS V. (RIGHT).

The section passes obliquely. It cuts through the bodies of the pubic bones and the *symphysis pubis*. The pubic tubercle projects on each side from the pubis. On the left side the inguinal ligament is attached to the tubercle. Below the pubes the section passes through the structures of the thigh.

Above the pubes the section passes through the whole thickness of the anterior abdominal wall. In the mid-line over the pubes the peritoneal cavity has been opened. At the lower margin of the pubes the section cuts the arcuate ligament of the pubis. It is wide and strong, forming a smooth arch between the lower borders of the two bones. On either side the deep fascia of the thigh is directly continuous with the ligament. Below the pubic arch the crura of the clitoris have almost reached the mid-line. They have a strong aponeurotic attachment to the fascia and the arcuate ligament laterally, but above there is a space between the crura and the arcuate ligament through which several small vessels representing the dorsal vein of the clitoris are passing back into the pelvis.

Immediately below the crura of the clitoris the folds of the *labia minora* bound the narrow space of the vestibule. The *labium minus* on the right side descends to a lower level than on the left side. Immediately below the *labia minora* is the cleft of the *rima pudendi* bounded laterally by the *labia majora*. In the substance of the labia there may be seen the erectile tissue of the bulb of the vestibule. The mass of each *labium majus* is formed of adipose tissue which passes up and surrounds the bulb of the vestibule and the *crus clitoridis* on each side.

The section of which this forms the anterior surface, varies in thickness. On the left side it is fifty-five millimetres thick, while on the right side it is seventy-five millimetres in thickness. The urethral and vaginal orifices lie in the *rima pudendi* in the substance of this section, being fifteen millimetres and twenty-five millimetres respectively from the surface of the section.

Section 2 (Section 2a is an enlargement of the central part of Section 2).—The surface of section 2 presents a more symmetrical appearance than

section 1. The rami of the pubis and ischium are cut at almost the same level on each side. The acetabulum has been cut across with the head of each femur. The obturator foramen appears in the section. On the left side the obturator vessels are seen in the obturator canal. On both sides the obturator membrane is clearly shown with the *obturator internus* clothing its medial surface. It is clothed in turn by the obturator fascia. On the right side the fascia may be traced to its bony attachment both above and below; but on the left side it ends above by passing over the upper border of the *obturator internus* muscle to become continuous with the obturator membrane. Arising from about the mid-point of the fascia of the *obturator internus* on its medial aspect there is a very definite sheet of fascia, the fascia coverinng the pelvic surface of the *levator ani*. Immediately below this for about fourteen millimetres on each side the fibres of the *levator ani* arise directly from the medial surface of the fascia of the *obturator internus*. The muscle fibres sweep downwards and inwards, passing round the lateral border of the vagina to sweep inwards under it towards the mid-line, where they may be seen entering into intimate relationship with the sphincter muscles of the anal canal. The tissue in the central part of the section is the anterior wall of the anal canal with its sphincters. The median cleft below is the natal cleft; the highest point of this at the level of the section is only about two millimetres from the muco-cutaneous junction of the anal canal. The apparently solid block of tissue occupying the space between the rami of the ischium is composed therefore of the series of structures lying between the posterior wall of the vagina and the skin. Thus it consists of the fibres of the *levatores ani* with their strong fascial sheaths on their pelvic and perineal surfaces which attach them firmly to the pelvic wall; of the sphincters of the anal canal; and of the dense white fibrous connective tissue of the perineal body. It is clearly shown how the lateral portion of the perineal body receives a firm attachment to the inferior rami of the pubis and ischium through the medium of the uro-genital diaphragm.

In the mid-line the vagina appears as a transverse slit cut across obliquely. It is forty millimetres above the deepest part of the natal cleft. It is thirty millimetres in width. The anterior and posterior vaginal walls are from 1·5 to 2·0 millimetres in thickness. Above and in front of the anterior wall the bladder lies. Between the two is a fibro-fatty layer about four millimetres in thickness, which appears to be only loosely attached to each organ with a plane of cleavage on each surface. The posterior wall of the vagina lies on the upper part of the perineal body without a clearly defined plane of cleavage. The lateral angles of the vagina, however, show a different arrangement of tissues. There is a dense mass of fibrous tissue in immediate relation with each lateral angle. On the left side the fascia covering the pelvic surface of the *levator ani* is thickened as it reaches the level of the vaginal angle and is directly connected to the dense connective tissue of the lateral vaginal angle. The *levator ani* muscle itself descends past the vagina to a lower level. Its lowermost fibres may be seen radiating at a distance of twenty-five millimetres below the vaginal angle and interlacing with the muscle fibres of the external *sphincter ani* and the fibrous tissue of the perineal body. The muscle fibres appear to be descending directly from their origin to be inserted into the lateral part of the perineal body and *sphincter ani*. It would appear that it could act as a "*levator perinei*" as well as a *levator ani*.

On the right side the lateral vaginal angle has attachments which are even more marked. There is a very dense mass of fibrous tissue in direct relation to it. On its lateral aspect this mass is firmly united to the fascia on the pelvic surface of the *levator ani*, while some of the fibres of the *levator ani* appear to be inserted directly into it as well. Below the muscle there is dense tissue which is attached medially to the vagina, while laterally it is attached to the inferior ramus of the ischium and the internal pudendal vessels lie in it. This tissue is the base of the uro-genital diaphragm and the *levator ani* is lying immediately above it. It is the point where the lateral vaginal angle is in intimate relation with these two structures. The perineal body lies below and behind these structures, but is intimately connected to them by fibrous tissue.

The line of section cuts the vagina about its middle. On inserting the finger into the vaginal passage the uterus is found to be drawn over to the left and the right lateral fornix is deep and wide. It is fifty millimetres from the line of section to the highest point of the right lateral fornix.

In the upper part of the pelvis in the mid-line the posterior part of the bladder lies on the anterior wall of the vagina. The bladder is covered on its superior aspect by peritoneum. The anterior surface of the body of the uterus with its fundus appears above the bladder. The *fundus uteri* is lying over to the left of the mid-line. The bladder wall is thick and muscular. The organ is in systole. The outer half of the bladder wall is fibrous and vascular. Inferiorly it is separated from the anterior vaginal wall by a layer of fatty tissue with lines of cleavage on either surface. On the right side there is a dense fibrous stratum which is connected to the bladder above and the anterior and lateral wall of the vagina below. The fascia on the pelvic surface of the *levator ani* is continuous with this mass of tissue.

Section 3 (Section 3a is an enlargement of the central part of this section).—The line of section passes through the "quadrate mass" of bone formed by the ilium and ischium. Below it is passing through the anterior part of the *tuber ischii*. On the left side the section is more dorsal than on the right, just clearing the acetabulum.

On both sides the bony wall is clothed by the *obturator internus* muscle whose fibres extend from the brim of the true pelvis to the inner aspect of the *tuber ischii*. The fascia covering the pelvic surface of the *obturator internus* is closely applied to it on the left side. At about the mid-point between the brim of the pelvis and the *tuber ischii* a thin layer of fascia takes origin from the medial surface of the fascia of the *obturator internus*. From this after a distance of about ten millimetres the fibres of the *levator ani* muscle arise and sweep medially and distally to become closely related to the wall of the anal canal, lying ultimately between the internal and external sphincters. On the right side there is a similar arrangement.

In its lower part the *obturator internus* is thickest about twenty millimetres from its lowest border. From this point the muscle thins rapidly as it approaches the *tuber ischii* and its lower medial surface looks downwards as well as inwards. The fascia covering the lower part of the muscle is much thicker than that above. This fascia contains between its layers the internal pudendal vessels and nerves. It is Alcock's canal or the *fascia lunata* of Elliot Smith. Springing from the medial surface of the obturator fascia at a point about thirty millimetres above its attachment to the *tuber ischii* there is a strong layer of fascia which runs medially for about ten millimetres, where it fuses with the fascia on the inferior surface of the *levator ani*. This is the *lamina terminalis* of Elliot Smith. He describes it as forming a roof for the ischio-rectal fossa. But it seems to be much more than a roof. It is a strong and dense ligament suspending the anal canal from the lateral wall of the pelvis. This is very clearly brought out in this section where the rectum is very distended. It is seen that the *fascia terminalis* is attached to the lateral wall of the anal canal at its commencement. It suspends the anal canal directly from the pelvic wall. It acts here as the uro-genital diaphragm acts for the urethra and vagina; it takes the strain off the muscles. This is in accord with the general anatomical principle that tubes are suspended by fascial attachments, not by muscles and the muscles are thus left free to exert their contractile influence. The voluntary muscle function is active rather than passive. The plastic tonus of the sympathetic nervous system controls the bowel; that of the *levator ani* holds it in readiness, but the weight and strain are borne by the *fascia terminalis* which might thus be described as the lateral ligament of the anal canal. Above it the supra-tegmental space is well shown.

In the angle between the upper part of the *obturator internus*, the rectum and the *levator ani* is a mass of adipose tissue containing the ureters and many vessels. This is the connective tissue of the broad ligaments. On the upper part are the uterine tubes and the left ovary cut in section. The right mesosalpinx is also cut in section.

The pelvis is almost filled by the greatly dilated rectum.

Section 4.—On the left side the section passes through the greater sciatic foramen. The greater sciatic notch of the ilium forms its upper boundary, while the tip of the spine of the ischium remains below. In the mid-line is the tip of the coccyx inferiorly, while the fifth lumbar vertebra and a small part of the promontory of the sacrum are seen in the upper part of the section.

On the right side the plane of the section is anterior to that of the left side. Thus the bony pelvic wall is cut immediately anterior to the anterior margin of the greater and lesser sciatic foramina. Here the bony wall is clothed by the *obturator internus* muscle and its fascia. The *coccygeus* muscle stretches from the spine of the ischium to the tip of the coccyx on either side completing the pelvic floor. Below it the fat of the ischio-rectal fossa appears.

The posterior part of the pelvic cavity is almost filled by the greatly dilated rectum.

The right ureter passes down behind the peritoneum in close relation to the side of the distended bowel and underlying the ovary. The left ureter is not in the plane of section.

Pelvis VI.

Pelvic measurements:

Interspinous	220 millimetres
Intercristal	250 millimetres
Intertrochanteric	280 millimetres

Pelvis cut in oblique sections parallel with the plane of the brim.

An attempt was made to cut the sections parallel to the plane of the brim of the pelvis, but in the cutting the sections are on a deeper plane on the right side than on the left. There are four planes of section.

Section 1.—The first plane of section cuts the skin of the *mons pubis* thirty-five millimetres below the upper margin of the *symphysis pubis*. On the left side it is sixty millimetres below the left anterior superior iliac spine, while on the right it is one hundred and forty-five millimetres below the corresponding point. On the left side the section passes five millimetres above the level of the brim of the true pelvis. Anteriorly the superior ramus of the pubis is cut for twenty-five millimetres lateral to the pubic tubercle. On the right side the section passes through the upper part of the wall of the true pelvis, through the pubis and its superior ramus throughout their length and then through the ilium and the upper part of the acetabulum. Posteriorly it passes through the first piece of the sacrum and both sacro-iliac joints.

Medial to the bony wall the cavity of the true pelvis is lined by an almost complete ring of peritoneum. Lying in the extraperitoneal tissue the hypogastric vessels may be seen in close relation to the sacro-iliac joints with the ureters antero-lateral to them. On the right side a small portion of the uppermost fibres of the *obturator internus* muscle clothes the medial aspect of the ilium.

Opposite the acetabulum the round ligament of the uterus is rising out of the pelvis immediately under the peritoneum. On the dorsal surface of the pubes the upper part of the bladder is seen in the extra-peritoneal space. The peritoneal cavity contained a great deal of old blood clot as if there had been an old pelvic hæmatocele. This has been cleared away. There is evidence of an old double infective salpingitis of long standing as a result of which both tubes are distorted. On the right side there was apparently superadded an old hæmato-salpinx with an associated pelvic hæmatocele. All this has destroyed the relations in the pelvic peritoneal cavity and has obliterated the configuration of the organs. The pelvic colon is attached to the posterior wall of the pelvis by its mesocolon.

Section 2.—The plane of section lies about thirty millimetres below the first plane. On the left side the section is through the lowest part of the body of the pubis and about five millimetres below the lower margin of the symphysis. Here the strong arcuate ligament is seen binding the bones together in the mid-line. Laterally it passes across the obturator foramen and then through the quadrate mass of the lateral bony wall and the acetabulum. The left sacro-iliac joint is opened in its lower part. The sacrum is cut through about the level of its third segment. On the right side the section crosses the obturator foramen and the ischium, touching the lowest limit of the acetabulum. It cuts the anterior margin of the greater sciatic foramen about twenty millimetres above the spine of the ischium and just includes the lowest part of the right sacro-iliac joint.

On both sides the *obturator internus* muscle clothes the lateral wall of the pelvis. On the left side it is attached to both the anterior and posterior margins of the obturator foramen; the obturator canal is seen to a small extent above the muscle. Then it clothes the medial aspect of the bony wall back to a point about twenty-five millimetres in front of the left sacro-iliac joint. A lymphatic gland lies medial to its centre. Behind the posterior margin of the muscle are some of the cords of the sacral plexus and the hypogastric vessels. On the right side the muscle clothes a small portion of the pubis, the obturator membrane and the whole of the lateral bony wall back to the margin of the sciatic notch. On both sides its medial surface is clothed by a strong sheet of fascia.

The *levator ani* muscle is shown at different levels on the two sides. On the left side it takes origin from the dorsum of the pubis to within ten millimetres of its medial margin and from the medial surface of the obturator fascia for about ten millimetres lateral to the anterior margin of the obturator foramen. It is covered medially by a strong sheet of fascia which blends with the fascia of the *obturator internus* at the point just indicated. On the right side more of the muscle is seen. Its fibres are arising from the dorsum of the pubis six millimetres from its medial margin and from the medial surface of the obturator fascia back to the posterior margin of the obturator foramen. The fascia on the pelvic surface of the *levator ani* is more dense on this side. Note the layer of fatty tissue between the *levator ani* and the *obturator internus*, also between the latter muscle and its fascia.

The bladder is opened across its middle. The urethra and the base of the bladder are included in the thickness of the section. The bladder is related anteriorly to the arcuate ligament, the pubic bones and the *levator ani* muscles. The muscular wall of the bladder is clothed by a thin layer of fat. At each lateral angle the bladder wall is in contact with the extraperitoneal connective tissue. The superior surface of the bladder is covered with peritoneum.

The peritoneum forms the floor of the vesico-uterine pouch and is reflected over the anterior surface of the uterus and broad ligament. On the left side the round ligament runs upwards and outwards under the peritoneum. The uterus is not clearly defined. The parametric tissue especially on the left side has been the seat of an old standing and severe inflammation. It is, therefore, disorganized. There is also some thickening under the peritoneum of both leaves of the broad ligament on the right side. Both uterine tubes are disorganized.

Posteriorly the rectum lies in the mid-line immediately in front of the third piece of the sacrum. The peritoneum is reflected from its lateral surfaces leaving its posterior surface bare and in contact with the extraperitoneal connective tissue. A little to the left of the rectum the superior hæmorrhoidal artery is descending in the extra-peritoneal tissue.

The vagina lies in the deeper part of this section below the base of the bladder.

The ureters are just entering the posterior borders of the broad ligaments on both sides. On the left side the ureter is medial to the lymphatic gland that appears in the connective tissue.

Section 3.—The plane of section passes through the lateral walls of the pelvis at different levels on both sides. On the left side the inferior ramus of the pubis is seen, then the obturator foramen, then the body of the ischium and the lowest part of the acetabulum. On the right side the *tuber ischii* is cut in section. Posteriorly the fourth piece of the sacrum is cut. The *pyriformis* is attached to it.

The plane of the section passes through the vaginal orifice, but it is a little more horizontal than the plane of the vagina. The vagina itself lies in the thickness of the last section (2). The perineal body is thick and strong. It occupies the whole thickness of this section.

On the right side the section passes through the anterior margin of the *tuber ischii* approximately at the point of attachment of the uro-genital diaphragm. There are several bands of dense con-

nective tissue running from the bone to the lateral margin of the perineal body. These represent the base of the uro-genital diaphragm. They give the perineal body a direct strong attachment to the bony wall of the pelvis. Thus the perineal body is firmly fixed to the bones on both sides by the uro-genital diaphragm.

From the medial margin of the posterior part of the perineal body on the right side the *levator ani* can be traced back to the sides of the sacrum and coccyx. Lateral to and behind the base of the uro-genital diaphragm pale fat fills the ischio-rectal fossa.

Behind the vaginal orifice the recto-vaginal septum appears; then the upper part of the rectal pouch and the pouch of Douglas, with a pelvic hæmatocele occupying and distending it.

Pelvis VII.

Dissection of Perineum Down to the Superficial Surface of the Uro-Genital Diaphragm on the Left Side and Dissection of Ischio-Rectal Fossa.

Pelvic measurements:

Interspinous	210 millimetres
Intercristal	240 millimetres
Intertrochanteric	270 millimetres

On the right side the skin has been left intact from the anus to the pubis. Inside the fold of the *labium majus* the *labium minus* extends back bounding the vestibule. In the mid-line the *glans clitoridis* is exposed. The triangular vestibule contains the urethral orifice and is bounded posteriorly by the vaginal orifice. The vaginal orifice gapes a little and there is a slight degree of rectocele. The perineal body has been lacerated; from the muco-cutaneous junction of the perineum to the mucous membrane of the anus is fifteen millimetres.

On the left side the skin, mucous membrane and superficial fascia have been removed from the upper border of the pubis back to the ischio-rectal fossa.

Anteriorly the body of the pubis is exposed. The inferior margin of the inferior rami of the pubis and ischium may be followed back to the *tuber ischii,* the most prominent portion of which projects from under cover of the *gluteus maximus.* Some of the adductor muscles of the thigh, for example, the *gracilis* and *adductor magnus,* are arising from the lateral border of the ischio-pubic rami.

In the mid-line anteriorly the *mons pubis* is cut through down to the anterior surface of the *symphysis pubis.* It consists of a thick pad of fatty and fibrous tissue. In its deeper part appears the suspensory ligament of the clitoris. Opposite the lower portion of the pubis is the body of the clitoris. It is formed by the junction of the *crura clitoridis.* It curves strongly forward and downwards, extending for twelve millimetres to the *glans* which is five millimetres in length, giving the organ a total length of seventeen millimetres. It is ten millimetres thick from its dorsal to its ventral border.

The uro-genital diaphragm or triangular ligament is a very strong and definite structure situated in the anterior portion of the perineum. It is attached by its lateral border to the medial margin of the ischio-pubic rami. The base of the uro-genital diaphragm is well defined. Its point of attachment is about thirty millimetres in front of the most prominent part of the ischial tuberosity at a level corresponding to the anterior margin of the anal canal. From these bony attachments the uro-genital diaphragm sweeps in towards the mid-line where it has a direct attachment to the lateral wall of the vagina about fifteen to twenty millimetres inside the vaginal orifice. Behind the vagina it is fused with the perineal body. On its superficial aspect are placed the *crus clitoridis* and the bulb of the vestibule. The *crus clitoridis* is thin and tapering posteriorly, extending back to the margin of the *tuber ischii.* Traced forwards it increases in size and unites in the mid-line with the *crus clitoridis* from the opposite side to form the body of the clitoris. Throughout its length it is firmly attached to the ischio-pubic rami and the uro-genital diaphragm. It is clothed by the fibres of the ischio-cavernosus (*erector clitoridis*) muscle. The bulb of the vestibule is closely applied to the lateral wall of the vagina, lying on the superficial surface of the uro-genital diaphragm. Anteriorly it becomes thin, but may be traced round the urethra to join the body of the clitoris. This thin portion is the *pars intermedia.* The bulb of the vestibule is clothed by the fibres of the bulbo-cavernosus muscle. Closely related to the posterior part of the bulb of the vestibule is the gland of Bartholin which may be seen as a thin-walled, rounded structure about eight millimetres in diameter.

The uro-genital diaphragm lies in an oblique plane, running downwards and inwards from the bony attachment at an angle of about 45°. It is two or three millimetres in thickness.

The ischio-rectal fossa is exposed on both sides. Its lateral boundary is formed by the wall of the pelvis clothed by the *obturator internus* muscle and its fascia. This fascia is greatly thickened near the *tuber ischii.* The crescentic ridge formed by the internal pudendal vessels and nerves in "Alcock's canal" is easily seen on both sides. The orifices of the inferior hæmorrhoidal vessels (which have been cut away) appear along the line of the canal. This thickening of the fascia is described by Elliot Smith as being due to the sheaths of the neuro-vascular bundles of the internal pudendal structures and not to a "splitting of the layers of the fascia of the *obturator internus.*" He gives it the special name of the *fascia lunata.*

Posteriorly the ischio-rectal fossa appears to be bounded by the inferior border of the *gluteus maximus.* It extends, however, under cover of this muscle for about fifty millimetres. On looking into this part of the fossa its posterior boundary is seen to lie at the point of fusion of the sacro-tuberous and sacro-spinous ligaments. The *gluteus maximus* arises from the former, while the *levator ani* and *coccygeus* are closely related to and attached to the latter. The sheath of the internal pudendal vessels can be seen emerging from between the ligaments posterior to the spine of the ischium. The medial wall which is strongly convex both from above downwards and antero-posteriorly, is formed

above by the *levator ani* muscle and below by the wall of the anal canal, clothed by the external *sphincter ani* muscle and the ano-coccygeal *raphé*. In a plane anterior to the anus the base of the uro-genital diaphragm bounds the fossa. But the deeper part of the fossa extends forward above the uro-genital diaphragm. The space diminishes rapidly as it is traced superiorly and anteriorly. Superiorly it is closed by the origin of the *levator ani* from the obturator fascia and the pubis. The connective tissues below this junction, including the *lamina terminalis* of Elliot Smith, have been removed. Inferiorly and medially the *levator ani* comes into close relation with the superior surface of the uro-genital diaphragm and the two structures maintain this relation till they come into relation with the lateral wall of the vagina. Anteriorly the space diminishes rapidly due to the convergence of its walls—the obturator fascia laterally, the *levator ani* above and the uro-genital diaphragm below.

Pelvis VIII.

Deep Dissection of Perineum.

The dissection has been carried to a deeper stage than in Pelvis VII. The ischio-pubic arch is completely exposed from one *tuber ischii* to the other. All the structures superficial to the uro-genital diaphragm have been removed. On the right side the uro-genital diaphragm has been left in position, but a portion of its base has been cut away in a crescentic fashion to expose the *levator ani* muscle. On the left side the uro-genital diaphragm has been completely removed. All that remains of the vulvar cleft is that bounded by the cut walls of the vagina and vestibule. Within this oval space are the urethral and vaginal orifices. The vagina is forming a cleft flattened antero-posteriorly. At a point just above the urethral orifice the lumen of the vagina is thirty-five millimetres in width.

On the right side the uro-genital diaphragm is directly attached to the vaginal wall along its lateral margin. Laterally and anteriorly the uro-genital diaphragm is strongly attached to the ischio-pubic rami. Posteriorly the base of the uro-genital diaphragm is in continuity with the perineal body.

On the left side the uro-genital diaphragm has been removed. Its line of attachment to the vagina is indicated by the incision along the vaginal wall. On inserting an instrument into the vagina the point of attachment of the uro-genital diaphragm is found to coincide with the deepest part of the lateral vaginal groove.

Lateral and superior to the insertion of the uro-genital diaphragm into the vagina the medial fibres of the *levator ani* sweep back round the vagina and in close relation to it. The muscle margin is bound to the vaginal wall by fibrous tissue. Posterior to the vagina the medial fibres of the *levator ani* are inserted into the perineal body. They sweep to meet the fibres of the corresponding muscle of the opposite side in the mid-line. Thus the medial margins of the *levatores ani* muscles bound an oval opening, the genital hiatus, through which the urethra and vagina escape from the pelvic cavity and reach the surface. The *levatores ani* closely embrace the vagina and are directly related to it above the level of insertion of the uro-genital diaphragm and they meet in the perineal body behind the vagina.

The perineal body is twenty millimetres in length and shows signs of obstetric laceration. The anterior fibres of the external *sphincter ani* are passing into its posterior part; the medial fibres of the *levatores ani* are inserted into it laterally, while anteriorly and laterally the fibres of the uro-genital diaphragm are inserted into it.

The ischio-rectal fossa shows the same features as Pelvis VII.

Pelvis IX.

Dissection of Pelvic Floor to Display Superior Surface.

The viscera together with their blood and nerve supply and connective tissue packing have been removed down to the superior surface of the pelvic floor. On the right side the fascia is in position, while on the left the muscles have been exposed.

The Fascia.—A dense, strong sheet of white fascia extends from the pubes to the greater sciatic foramen, skirts the latter opening and sweeps back to the sacrum and coccyx. There are two openings in the wall of the pelvis above the fascia, namely, the obturator canal and the greater sciatic foramen. Each of these is bounded above by bone and below by the free crescentic margin of the pelvic fascia. Between the obturator foramen and the greater sciatic foramen the fascia extends up to the ilio-pectineal line. The fascia sweeps round the posterior border of the *obturator internus* to receive attachment to the bone. At the lower border of the foramen it forms a free crescentic edge, as already stated, and passes back to fuse with the fascia covering the anterior surface of the *pyriformis*. Above the margin of the fascia the trunks of the sacral plexus pass out through the greater sciatic foramen.

A well marked thickening, the "white line" of the pelvic fascia or *arcus tendineus* extends from the middle of the dorsum of the pubis to the spine of the ischium. It lies twenty-five millimetres below the obturator canal and fifty millimetres below the brim of the pelvis, where it is formed by the quadrate mass of bone bounding the greater and lesser sciatic notches. Above this line the fascia is smooth and taut, closely investing the *obturator internus*; but below the line it is more lax and is thrown into folds. From the *arcus tendineus* the fascia passes down into the depths of the pelvis towards the mid-line. It ends by becoming continuous with the walls of the bladder and urethra and the vagina, while behind the vagina it dips down as a sheath for the compartment in which the anal canal lies.

From the ischial spine the fascia sweeps back, extending across the mid-line behind the rectum to become continuous with a similar sheet from the

opposite side. It ends by becoming attached to the lateral parts of the sacrum and coccyx and to the anterior surface of the sacro-spinous ligament. In the mid-line posteriorly there is a V-shaped gap in the fascia on the anterior surface of the coccyx. From the margins of this gap to the anal canal the fascia is thickened in the mid-line, forming a strong *raphé*.

The Muscles.—On the left side the fascia has been removed with the exception of the *arcus tendineus*, which stretches from the back of the pubes to the spine of the ischium.

The *obturator internus* muscle clothes the lateral wall of the pelvis from the dorsum of the pubis to the greater sciatic foramen. The fibres of the muscle take origin up to the ilio-pectineal line. The fibres converge towards the lesser sciatic notch where they leave the pelvis. The *arcus tendineus* covers the lower part of the muscle.

The *pyriformis* muscle arises here from the third and fourth pieces of the sacrum; it occupies the posterior part of the greater sciatic foramen through which it reaches the buttock.

The *levator ani* muscle is displayed from its origin to its insertion. The medial margin of the muscle forms a well defined and slightly concave border fifteen millimetres lateral to the *symphysis pubis*. The medial and anterior fibres have a two-fold origin. A band twelve millimetres wide arises from the back of the pubis and the fascia covering the *obturator internus* muscle above the anterior end of the *arcus tendineus*. The remainder of the muscle fibres arise from the *arcus tendineus* and the spine of the ischium. The medial border sweeps downwards and backwards and is in close relation with the base of the bladder and the lateral wall of the vagina, where it disappears from view. The remaining fibres show varying degrees of obliquity. The fibres from the anterior half of the *arcus tendineus* are related to the vagina and rectum. The posterior fibres pass through the ano-coccygeal *raphé*. The more posterior part of the muscle is replaced by tendinous fibres. The *coccygeus* muscle is represented by a further series of tendinous fibres. These fibres lie on the pelvic aspect of the sacro-spinous ligament and are attached to the sides of the lower pieces of the sacrum and coccyx, completing the pelvic wall posteriorly.

Measurements of the genital hiatus formed by the *levatores ani* and the associated visceral canals:

Pubes to front of coccyx	103 millimetres
Pubes to posterior wall of anal canal ..	60 millimetres
Pubes to vagina (lumen)	35 millimetres
Pubes to urethra (lumen)	18 millimetres
Transverse width of hiatus opposite urethra	28 millimetres
Transverse width of hiatus opposite vagina	35 millimetres
Distance between ischial spines	115 millimetres

Pelvis X.

Dissection of Pelvis from Median Sagittal Plane.

When the pelvis was cut in section the uterus contained a large fibromyoma. This distorted the uterus which was removed.

The Right Half.—The visceral canals have been left in position. Above the pelvic floor the viscera with their vascular and nerve supplies and the pelvic connective tissue have been removed and the pelvic floor has been exposed. The pelvic fascia also has been removed and the muscles are laid bare.

The *obturator internus* muscle clothes the lateral pelvic wall from the dorsum of the pubis to the greater sciatic foramen. The muscle fibres bound the obturator foramen while posterior to it they extend up to the ilio-pectineal line. Below they converge towards the spine of the ischium.

The *levator ani* muscle arises from the dorsum of the pubis to within twelve millimetres of the mid-line. Its medial margin is in close relation to the lateral borders of the urethra, vagina and anal canal and is concealed by these structures. The muscle origin extends along the *arcus tendineus* to the spine of the ischium. From this origin the fibres descend with varying density to the mid-line from the posterior wall of the anal canal to the tip of the coccyx and the sides of the sacrum and coccyx. There is a gap in the muscle fibres anterior to the coccyx.

The *coccygeus* muscle is represented by a few delicate muscular fibres and much white fibrous tissue lying on the pelvic surface of the sacro-spinous ligament.

The sacro-spinous ligament stands out as a strong dense structure arranged in a fan-shaped manner, extending for fifty-five millimetres from the margin of the fourth piece of the sacrum to the tip of the coccyx. Its fibres converge towards the spine of the ischium where they have a width of about fifteen millimetres. They thus form a strong support for the postero-lateral quadrant of the pelvic floor.

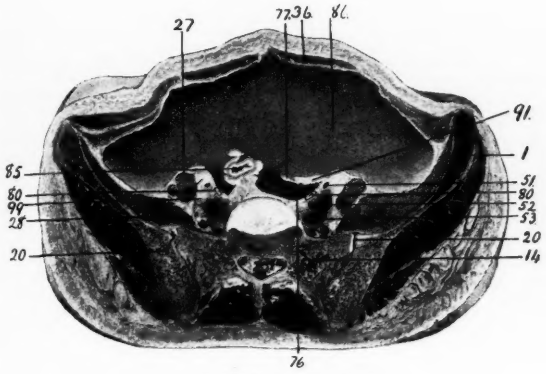
The greater sciatic foramen has been cleared of its contents. A few fibres of the *pyriformis* muscle remain above, while the floor is formed by the ventral or pelvic surface of the sacro-tuberous ligament with the fibres of the *gluteus maximus* muscle arising from its dorsal surface and lateral margin.

It is to be noted that the greater and lesser sacro-sciatic ligaments form a very strong and resilient floor for the postero-lateral quadrants of the pelvis. The *pyriformis* muscle fills the space between the sacro-spinous ligament and the bony wall, while the sacro-tuberous ligament is strongly supported by the *gluteus maximus* muscle.

The visceral canals have been removed above and below the pelvic floor. Portions of the urethra and vagina, each fifteen millimetres in length, have been left in position where these canals pierce the floor. The tissues superficial to the uro-genital diaphragm have been removed, while the anterior portion of the perineal body has been cut away.

The uro-genital diaphragm may be both seen and palpated. It is a strong, dense structure, attached firmly along the inferior ischio-pubic rami laterally, while medially it is strongly attached to the lateral parts of the urethra, vagina and perineal body. Thus it gives these structures firm support and attaches them to the bony wall of the pelvis.

ILLUSTRATIONS TO DR. F. A. MAGUIRE'S ARTICLE.



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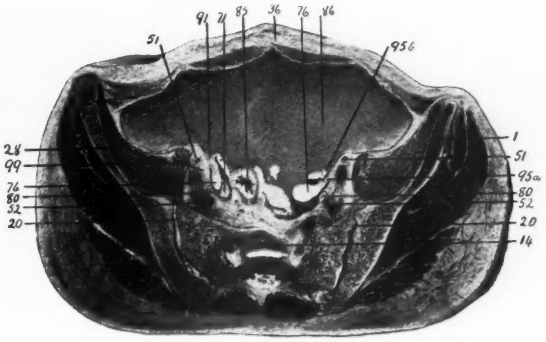

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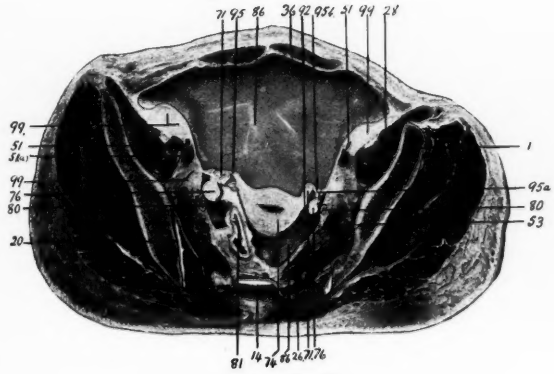

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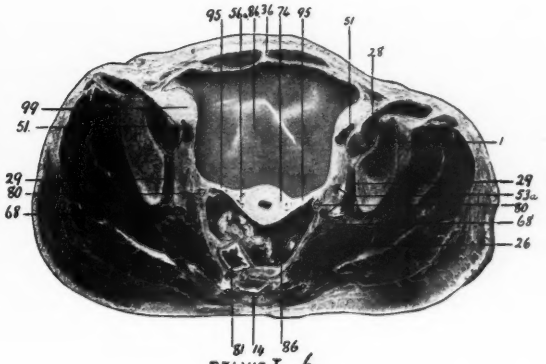

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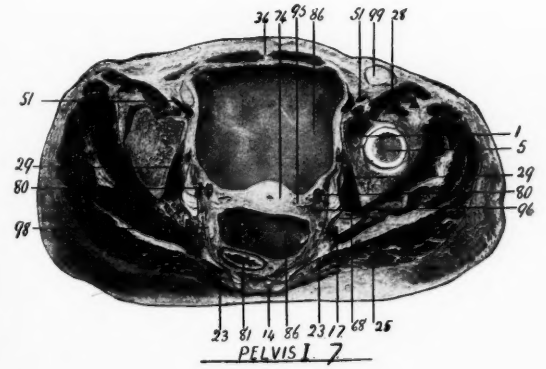

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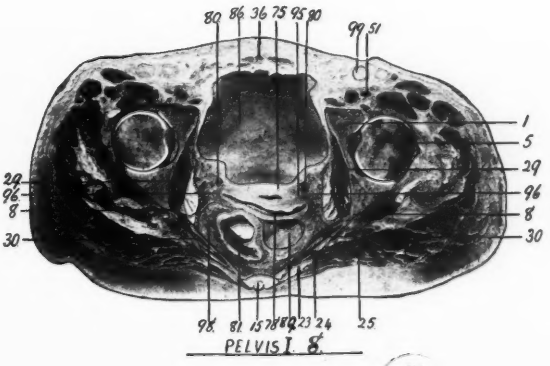

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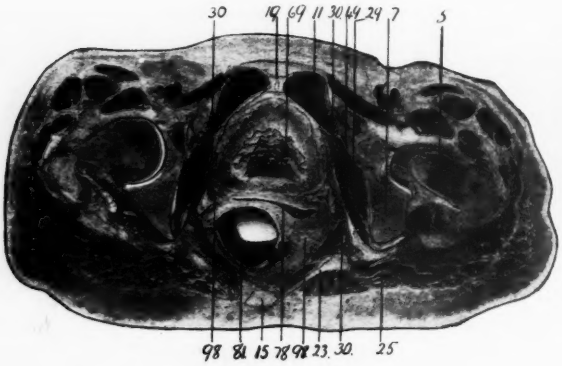
ILLUSTRATIONS TO DR. F. A. MAGUIRE'S ARTICLE—*Continued.*



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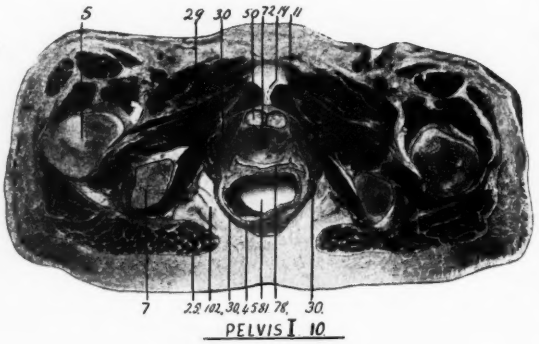

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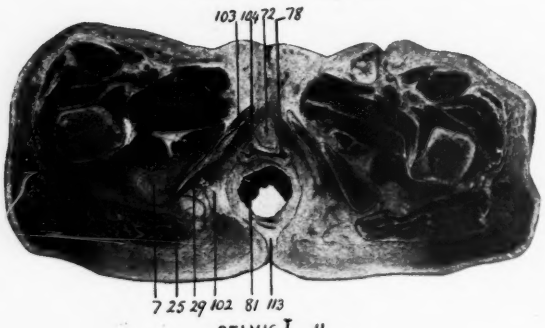

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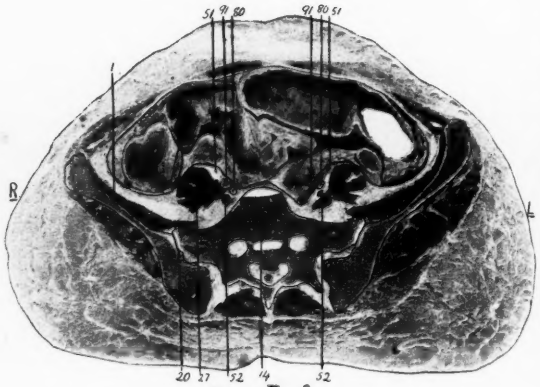

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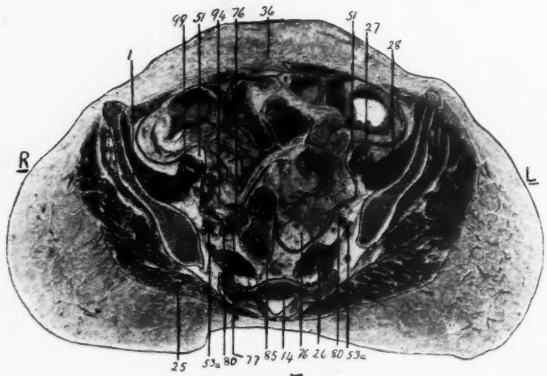

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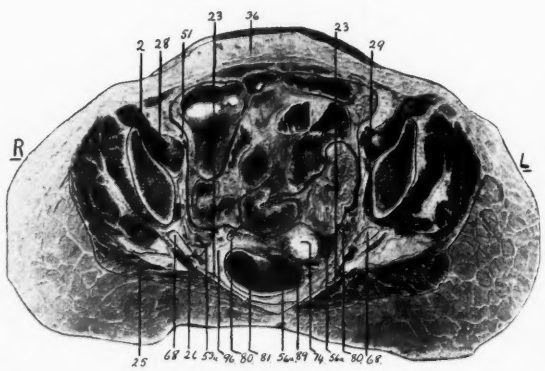

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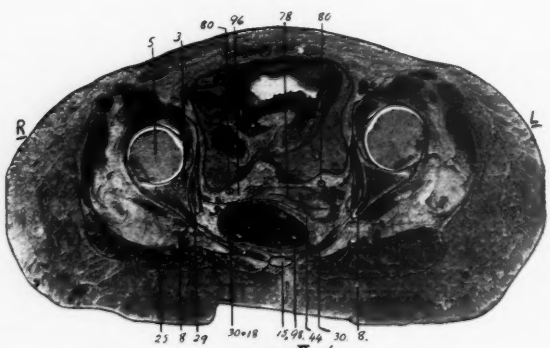

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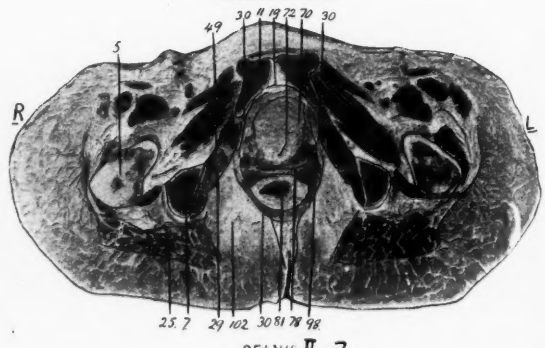

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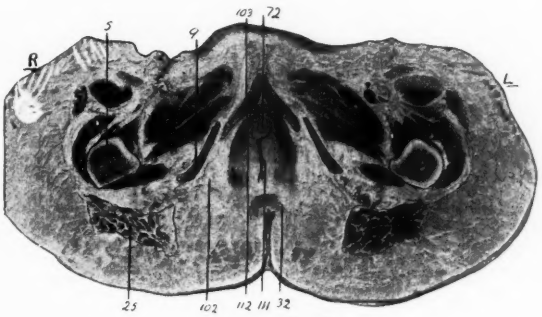
ILLUSTRATIONS TO DR. F. A. MAGUIRE'S ARTICLE—*Continued.*



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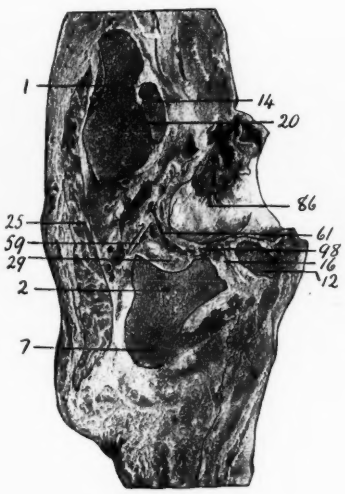

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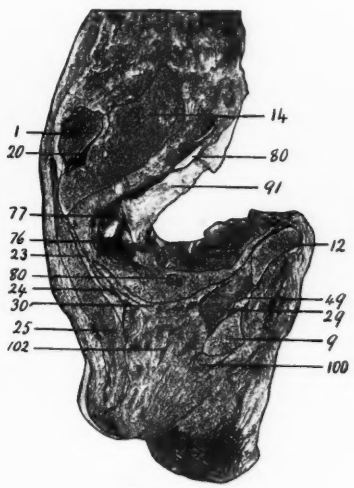

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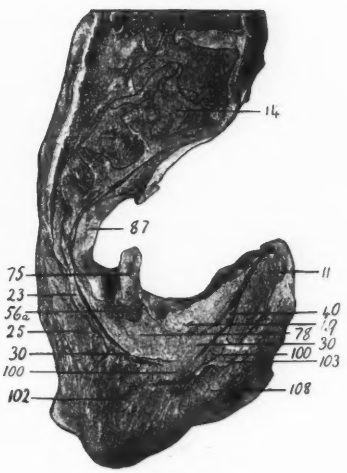
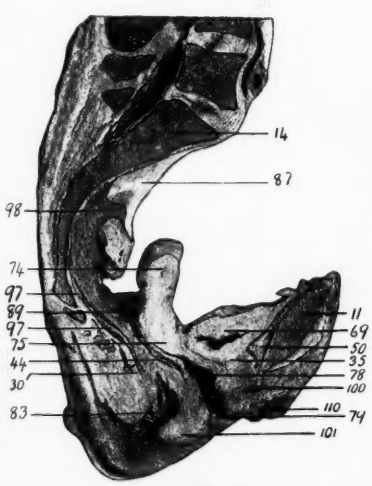
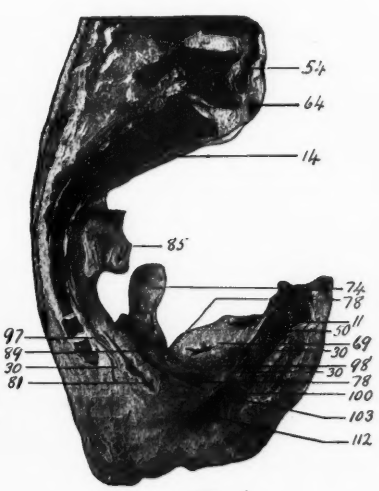


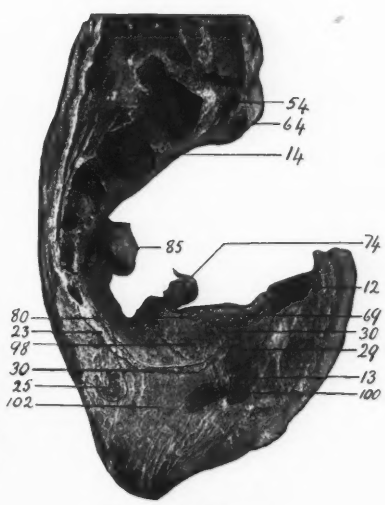
PELVIS III. 4.



PELVIS III. 5.



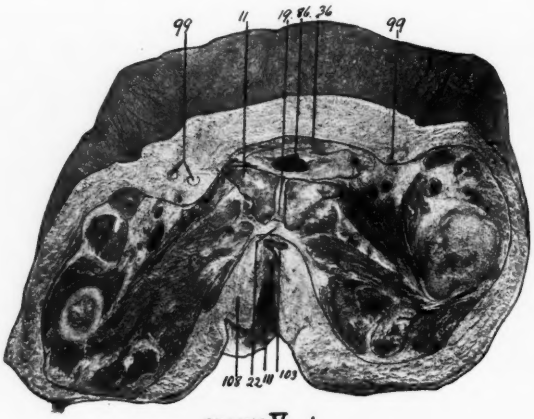
PELVIS III. 6.



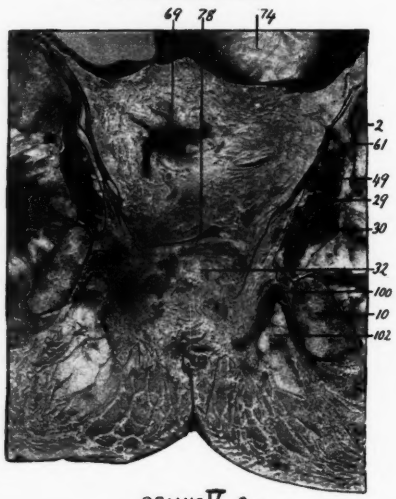
PELVIS III. 7.

ILLUSTRATIONS TO DR. F. A. MAGUIRE'S ARTICLE—*Continued.*

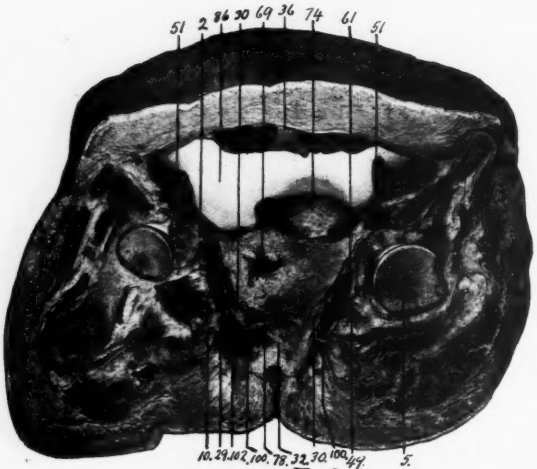
PELVIS IV



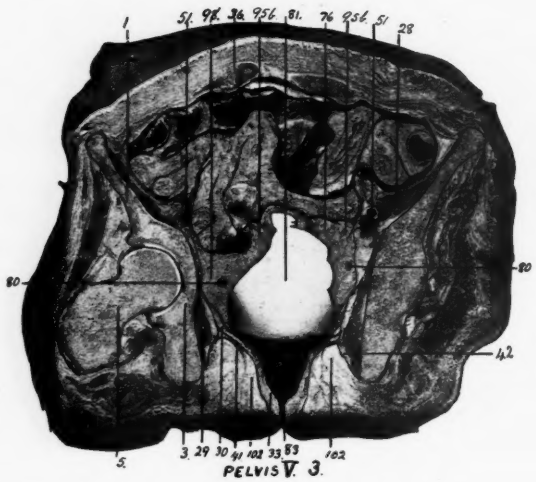
PELVIS V 1.



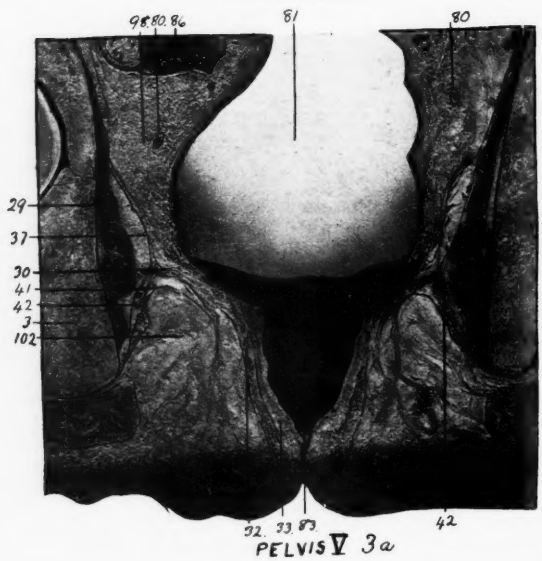
PELVIS V. 2a



PELVIS V. 2

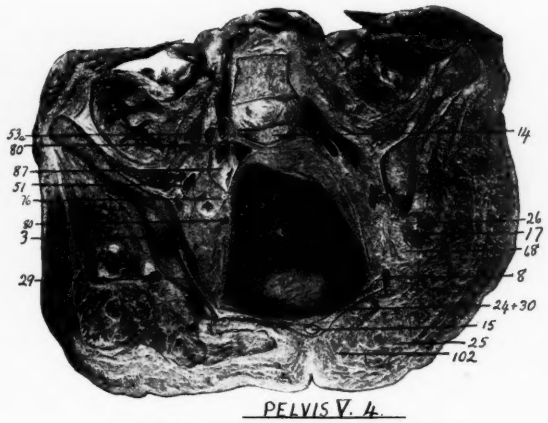


PELVIS V. 3.

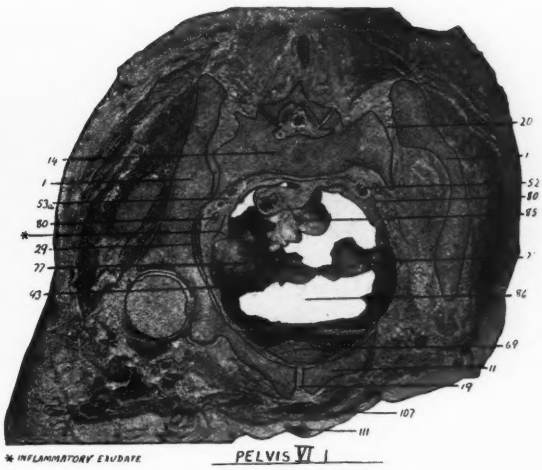


PELVIS V 3a

ILLUSTRATIONS TO DR. F. A. MAGUIRE'S ARTICLE—*Continued.*

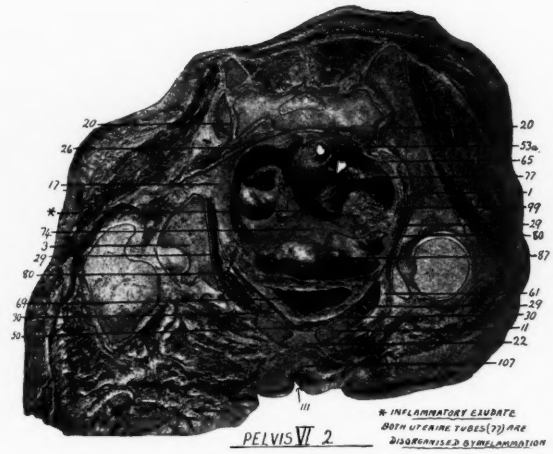


PELVIS V. 4.



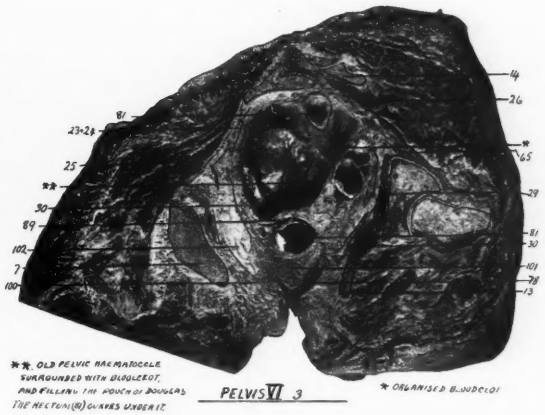
* INFLAMMATORY EXUDATE

PELVIS VI 1



* INFLAMMATORY EXUDATE BOTH UTERINE TUBES(?) ARE DISORGANISED BY INFLAMMATION

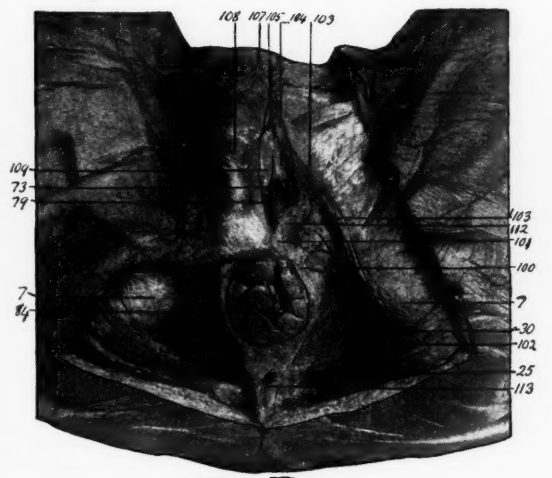
PELVIS VI 2



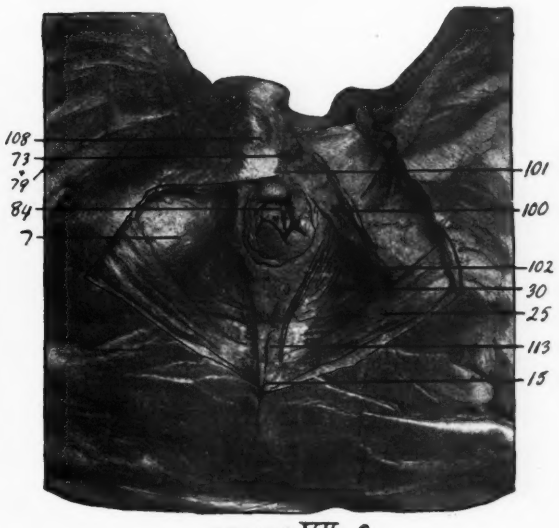
** OLD PELVIC HAEMATOCELE SURROUNDED WITH BLOODCLOT, AND FILLING THE POUCH OF DOUGLAS THE RECTUM(R) CURVES UNDER IT.

* ORGANISED BLOODCLOT

PELVIS VI 3

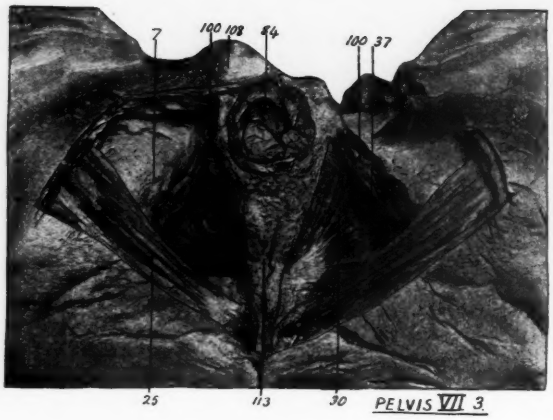


PELVIS VII. 1.

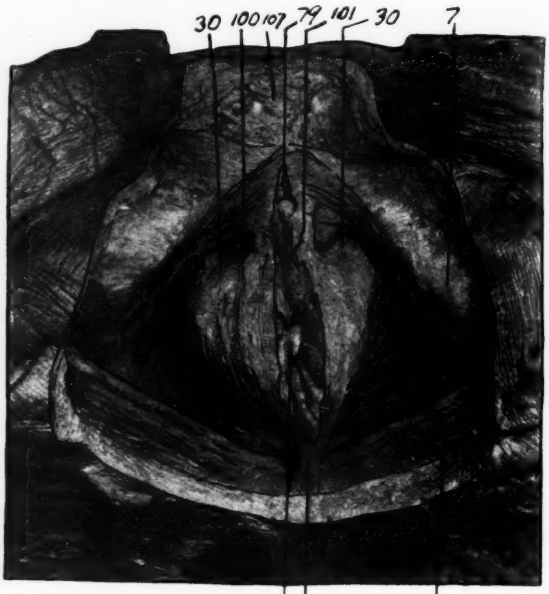


PELVIS VII. 2.

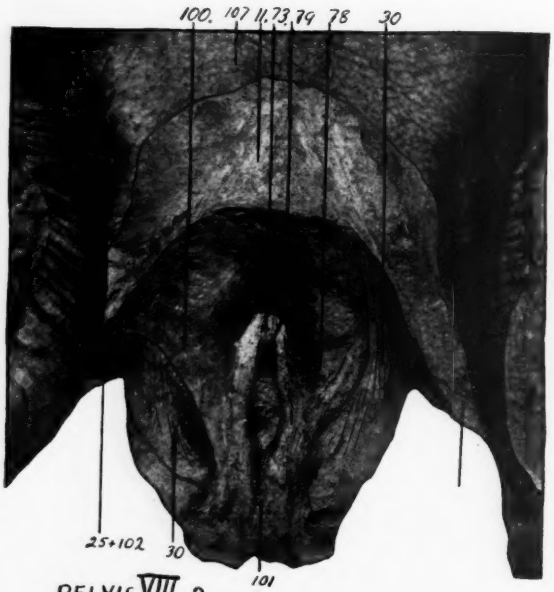
ILLUSTRATIONS TO DR. F. A. MAGUIRE'S ARTICLE—*Continued.*



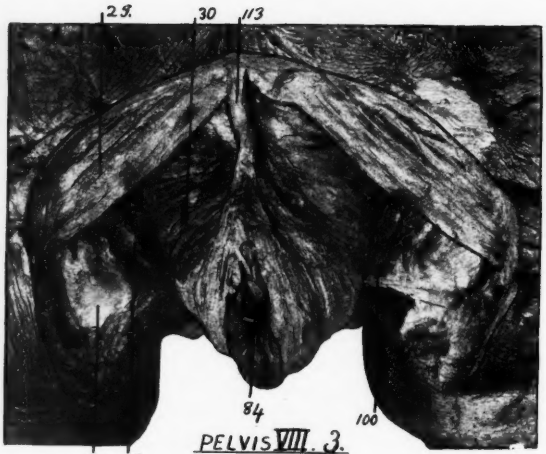
PELVIS VII 3.



PELVIS VIII 1. FROM BELOW.

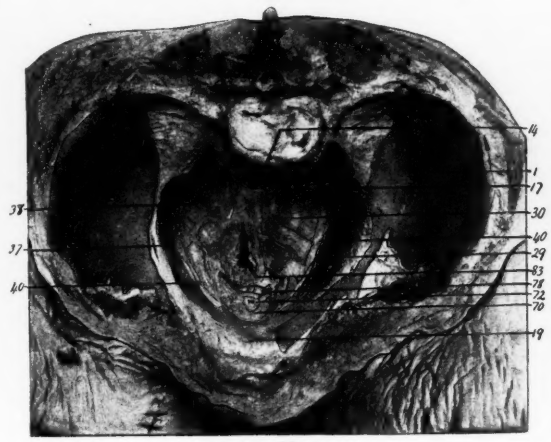


PELVIS VIII 2. FROM IN FRONT

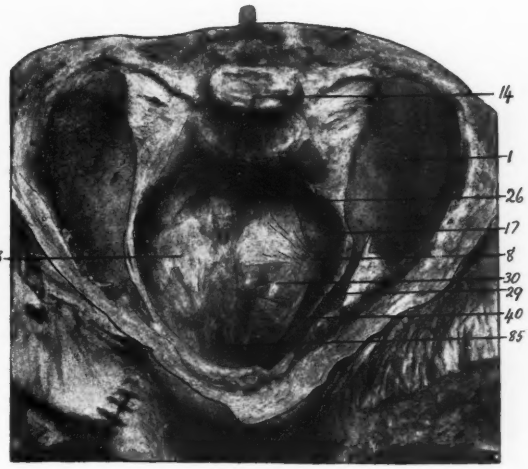


PELVIS VIII. 3. FROM BEHIND.

ILLUSTRATIONS TO DR. F. A. MAGUIRE'S ARTICLE—*Continued.*

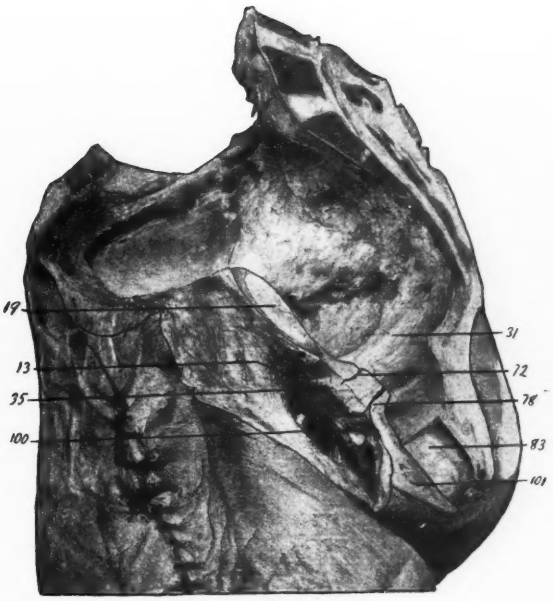


PELVIS IX. 1.
ANTERIOR PART OF PELVIC DIAPHRAGM.



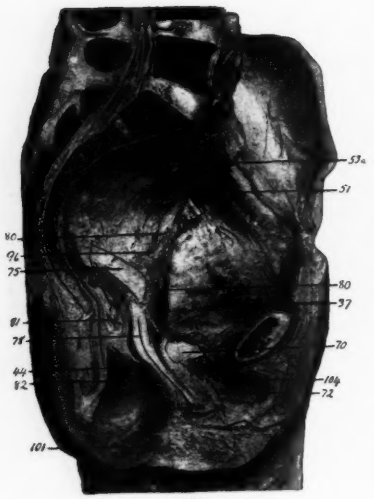
PELVIS IX. 2.
POSTERIOR PART OF PELVIC DIAPHRAGM.

PELVIS X A 1.

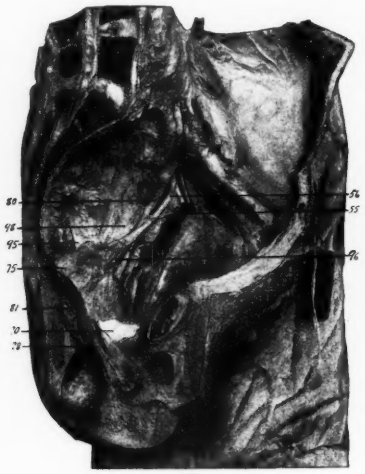


PELVIS X A. 2.
FROM BELOW AND IN FRONT.

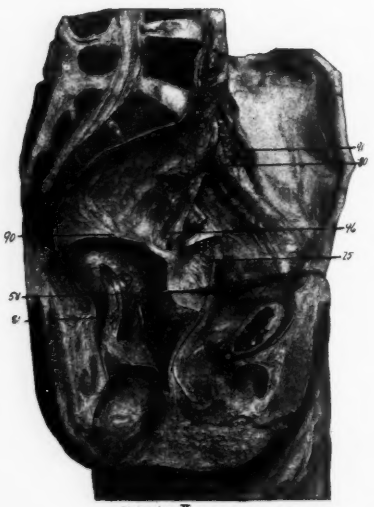
ILLUSTRATIONS TO DR. F. A. MAGUIRE'S ARTICLE—*Continued.*



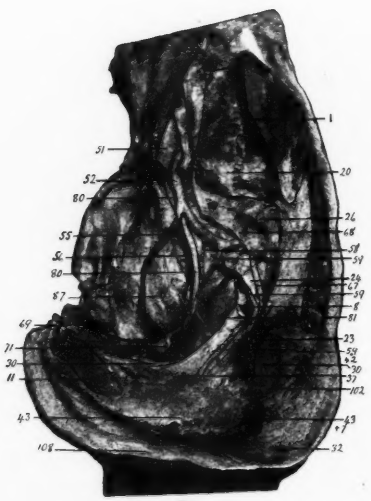
PELVIS X. B 1



PELVIS X B 2
FROM THE FRONT

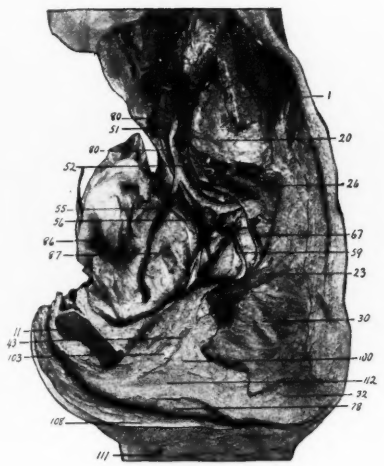


PELVIS X B 3. SHOWING RECTAL CHANNEL



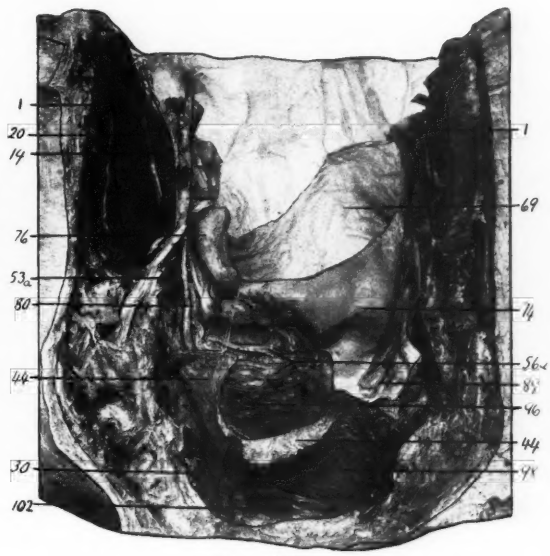
PELVIS XI 1.

ILLUSTRATIONS TO DR. F. A. MAGUIRE'S ARTICLE—*Continued.*

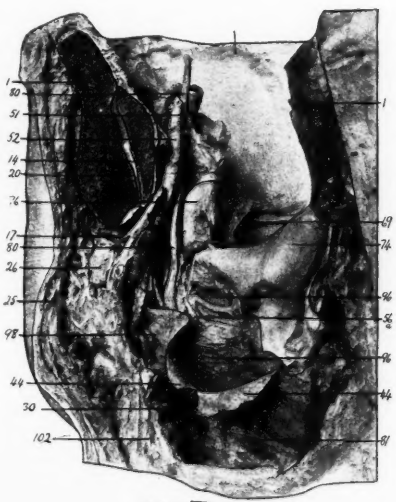


PELVIS XI. 2.

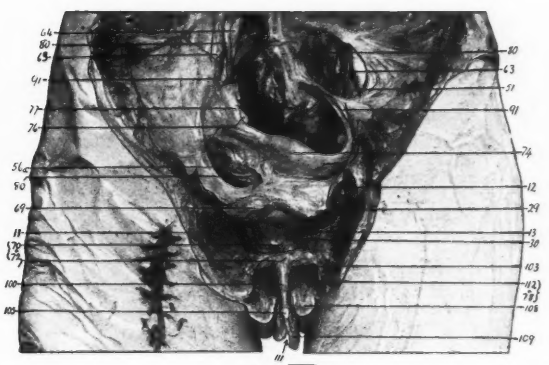
PERIOSTEUM EVERTED TO SHOW UROGENITAL DIAPHRAGM FROM BELOW



PELVIS XII. 1

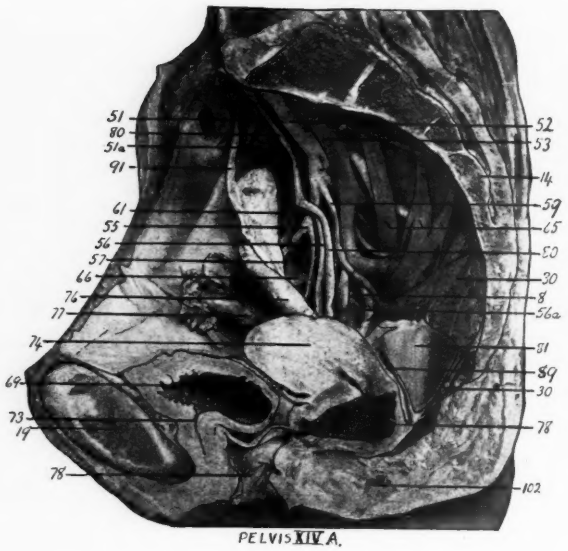


PELVIS XIII. 2.

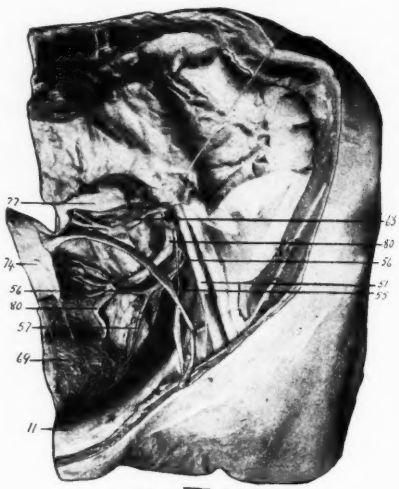


PELVIS XIII.

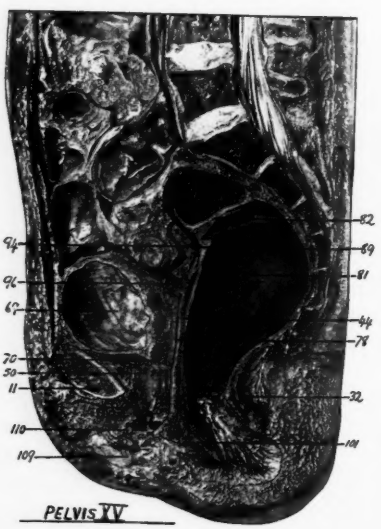
ILLUSTRATIONS TO DR. F. A. MAGUIRE'S ARTICLE—*Continued*.



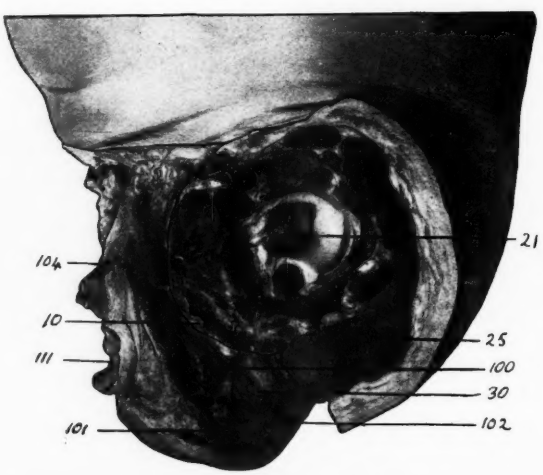
PELVIS XIV. A.



PELVIS XIV. B



PELVIS XV



PELVIS XVI (FOETAL)

NOTE. THE LEFT THIGH HAS BEEN CUT THROUGH
THE PICTURE IS FROM THE LEFT FRONT.

Looking at the urethral region from below (X. A 2) one may see concentric rings of muscle and fibrous tissue extending out for about fifteen millimetres from the lumen of the canal and coming into direct attachment to the uro-genital diaphragm both anteriorly and laterally. The medial surface of the section also shows a thick layer of muscle related to the lumen of the urethra. This is part of the urinary sphincter apparatus. Most of this muscle tissue really lies between the layers of the uro-genital diaphragm. The inferior fascia of the diaphragm has been removed to display it. The muscle obtains an attachment in this way, by medium of the uro-genital diaphragm, to the bony wall of the pelvis and so has a firm attachment on which to exert its pull in contraction.

The anal canal is dilated; this is due to *post mortem* plugging and does not represent the natural condition.

The Left Side.—On the left side of the pelvis the greater parts of the bladder and uterus have been removed. The uterus was distorted by a large fibromyoma and the cervix has been considerably distorted as a result. The vagina is cut throughout its length. The base of the bladder remains for about fifteen millimetres round the vesical orifice of the urethra. The plane of section has missed the lumen of the urethra. The terminal part of the rectum has been cut through for about seventy millimetres together with the anal canal. The latter structure has been artificially dilated. The structures superficial to the uro-genital diaphragm have not been disturbed. The body of the clitoris and *pars intermedia* have been cut through the greater part of their length.

The structures lateral to the bladder have been cut away and the pelvic wall is displayed down to the pelvic fascia. The *arcus tendineus* appears as a dense and tense curved structure stretching from the back of the pubis to the spine of the ischium. On palpation it is felt as a definite sharp edge. The base of the bladder rests upon the upper surface of the fascia of the *levator ani* below the arcuate tendon and is closely connected to it by fascia.

The psoas muscle and the external iliac vessels lie along the brim of the pelvis. The hypogastric vessels are situated in the postero-lateral quadrant of the pelvis. The pelvic connective tissue in relation with the hypogastric vessels and their branches has been left undisturbed. The tissues which form the mass of the broad ligament or the "parametrium" are exposed (X. B 2). They consist of the blood vessels, nerves and lymphatics which pass to and from the side of the *cervix uteri* and vagina, together with their connective tissue sheaths. These are the neuro-vascular bundles which assist in suspending the vault of the vagina and *cervix uteri* above the floor of the pelvis. The ureter pierces this parametric tissue, running obliquely downwards, forwards and inwards towards the base of the bladder. The *cervix uteri* is enlarged in this specimen by a fibroid growth which expands towards the left. The ureter is only three to four millimetres from the expanded *cervix uteri*.

On drawing the cervix forward (X. B 3) the peritoneum forming the anterior part of the pouch of Douglas is seen clothing the back of the cervix and the posterior fornix of the vagina. The uterine end of the utero-sacral fold of peritoneum is attached to the back of the body of the uterus at its junction with the cervix. From this point the utero-sacral ligament stretches dorsally to the front of the sacrum. The pelvic connective tissue is continuous with the lateral border of the utero-sacral ligament. It extends out to the pelvic wall and forward to the parametrium. The parametric tissue is bounded dorsally by a condensation of the pelvic connective tissue which forms a dense membrane, the recto-vaginal septum. In this specimen the septum is related to the vagina while the rectum has been stripped back from it. There is a very clear and definite plane of cleavage between the rectum and vagina along the plane of the recto-vaginal septum.

The rectum is lying in a very well defined compartment which is bounded by the recto-vaginal septum anteriorly, by the pelvic connective tissue laterally and posteriorly and roofed in by the utero-sacral fold and pelvic connective tissue laterally. This space allows the rectum to expand and contract according to its contents. It is described by various authors as a "rectal pouch" or a "rectal channel." If the rectum is drawn medially a leash of vessels, nerves and lymphatics which forms the middle hæmorrhoidal neuro-vascular bundle, may be seen (X. B 3) piercing the recto-vaginal septum and passing in a fan-shaped fashion to reach the lateral wall of the bowel. These structures all reach the rectum above the level of the inferior rectal valve (of Houston).

Pelvis XI.

Dissection of the Pelvis from the Left Lateral Aspect.

The bony pelvic wall has been removed on the left side of the pelvis from the body of the pubis to the left sacro-iliac joint. The periosteum was stripped off the inferior ramus of the pubis and off the rami and body of the ischium and left in position. Thus the outline of the inferior rami of the pubis and ischium and the *tuber ischii* and the body of the ischium together with the spine of the ischium can be seen. The dissection was then carried to deeper planes both in the perineal region and in the pelvis.

The Perineal Region.—The skin and subcutaneous tissues have been removed down to the superficial surface of the uro-genital diaphragm anteriorly and down to the *levator ani* in the depths of the ischio-rectal fossa posteriorly. The *rima pudendi* is visible in the mid-line below. One may identify the *mons pubis*, the *labia majora*, the vestibule with the urethral and vaginal orifices, the perineal body

and the anus. From the lateral aspect are seen the deeper structures of the *mons pubis* in relation to the ventral surface of the body of the pubis, the lateral surface of the vaginal wall, the inferior aspect of the uro-genital diaphragm with the bulb of the vestibule related to it where it is attached to the vagina medially, and the *crus clitoridis* where it is in continuity with the periosteum covering the inferior rami of the pubis and ischium laterally. In front of the vagina the outline of the body of the clitoris is shown. By everting the periosteal flap (XI. 2) the uro-genital diaphragm is brought clearly into view. It lies at a depth of about twenty to twenty-five millimetres from the surface of the *labium majus*. It extends from body of the pubis anteriorly to a line drawn from the middle of the *tuber ischii* to the middle of the perineal body posteriorly. The base of the diaphragm is irregular. Its general direction from side to side is in an oblique plane, having an angle of about 20-30° with the horizontal. The attachment of the uro-genital diaphragm to the lateral wall of the vagina and the perineal body is very clearly shown. The ischio-rectal fossa is displayed from the lateral and posterior aspects. The lateral wall is formed by the fascia of the *obturator internus* with the periosteum of the ischium both behind and above the attachment of the uro-genital diaphragm. Medially the wall is formed by the *levator ani* and the sphincter of the anal canal. The *levator ani* is sweeping downwards and backwards from its origin. The lowermost fibres are related to the upper surface of the uro-genital diaphragm, to the perineal body and to the *sphincter ani*. Above this level the fibres sweep directly backwards to the ano-coccygeal *raphé*, the sides of the sacrum and coccyx. Above this level it is intimately related to the ventral surface of the sacro-spinous ligament. The anterior part of the ischio-rectal fossa diminishes very rapidly in extent with the convergence of the fascia of the *obturator internus* laterally, the *levator ani* medially and the uro-genital diaphragm inferiorly. A blunt pointed instrument may be passed into this space above the uro-genital diaphragm for a distance of thirty-two millimetres.

The *levator ani* has two distinct layers of muscle fibres in it. The lower fibres which pass to the region of the *sphincter ani* and the ano-coccygeal *raphé* are much thicker and denser than those which lie above them and form the upper part of the medial wall. The latter are more widely spread out with intervals between them; they are more sparse and scattered in their arrangement. Above the level of the perineum the periosteum shows the outline of the rami of the pubis and ischium. The periosteum has been left intact for a width varying from ten millimetres anteriorly to twenty millimetres posteriorly. Above this level the periosteum and the fibres of the *obturator internus* muscle which arise from the medial surface have been removed. This has laid bare the space known as Alcock's canal which contains the internal pudendal vessels and nerves. Alcock's canal is usually described as being formed by a splitting of the fascia covering the lower part of the *obturator internus* muscle. Elliot Smith denies this and says that it is due to a condensation of the tissue surrounding the internal pudendal vessels. He gives it the special name of the *fascia lunata*. In the specimen the internal pudendal artery appears to terminate thirty millimetres above the inferior border of the *tuber ischii*. On everting the periosteum, however, this point is found to correspond with the base of the uro-genital diaphragm. The artery and nerve are changing direction and are about to pass between the two layers of the uro-genital diaphragm to reach their destination. Posteriorly the lateral end of the sacro-tuberous ligament has been detached from the dorsal border of the body of the ischium. It is seen as a projection about thirty-five millimetres above the lower border of the *tuber ischii*. The ligament can be traced back to the side of the sacrum. Anterior to the sacro-tuberous ligament and about twenty-five millimetres above its lateral end the tip of the spine of the ischium may be seen together with the sacro-spinous ligament which is attached to it. The base of the spine of the ischium is about fifteen millimetres in diameter. The internal pudendal artery is hooking round it to reach Alcock's canal (*fascia lunata*).

About ten millimetres above the line of the internal pudendal vessels the fascia of the *obturator internus* has been cut away leaving a crescentic margin. This corresponds throughout the greater part of its extent with the *arcus tendineus*. The *levator ani* is arising from its medial aspect. A few of its fibres may be seen above the centre of the crescentic margin. The *levator ani* is in turn covered on its medial surface by the pelvic fascia, the free margin of which can be seen along the whole length of the margin. Medial to the pelvic fascia is the cavity of the pelvis with the viscera. The pelvic peritoneum has been displayed from its lateral aspect. Closely related to the peritoneum on its lateral surface the ovarian leash of vessels, nerves and lymphatics is descending to reach the parametrium between the layers of the broad ligament. The blue veins stand out distinctly on the peritoneum. The left ovary itself may be seen through a small opening in the peritoneum dorsal to the ovarian vessels. The ureter descends in front of the hypogastric artery and runs down for about fifty millimetres closely related to the anterior border of the artery. It is in intimate relation with the peritoneum. It curves gently forwards and downwards after leaving the artery, passes through the parametric tissue in the base of the broad ligament and reaches the lateral angle of the bladder at a point about seven millimetres above the pelvic floor. The uterine artery is closely related to the ureter in the base of the broad ligament, passing over, that is superior to, the ureter on its way to the side of the uterus. The ovarian leash of vessels lies close to the ureter where it enters the pelvis. Here they are less than ten millimetres in front of it.

The hypogastric artery arises by bifurcation of the common iliac artery ten millimetres in front of the sacro-iliac joint. The hypogastric vein lies posterior to it and the ureter is immediately anterior to it. The obliterated hypogastric artery arises from its anterior border twenty millimetres below its origin. It soon becomes a fibrous cord, but before it does so the uterine artery arises from it six millimetres from its origin. The uterine artery passes directly downwards parallel with and five millimetres anterior to the ureter until it turns sharply inwards and crosses superior to the ureter to reach the uterus. In this specimen a vaginal artery arises from the uterine artery between the layers of the broad ligament. Twenty millimetres below the origin of the obliterated hypogastric artery a second vaginal artery is arising from the hypogastric artery. It descends behind the ureter to reach the lateral fornix of the vagina where it breaks up into several branches. Eight millimetres below the origin of the vaginal artery a trunk arises from the hypogastric artery and almost at once divides into two. The anterior artery represents the middle hæmorrhoidal vessels and passes to the side of the rectum, giving off as it does so a small branch which runs downwards and forwards to supply the *levator ani*. The posterior branch of this common trunk is the internal pudendal artery, the course of which has already been traced.

The lateral margin of the bladder lies under the peritoneum from the dorsum of the pubis back to the lateral angle about fifty millimetres behind the pubis. The ureter may be seen entering it at this point.

Immediately behind the lateral angle of the bladder is the lateral fornix of the vagina. The upper part of the vagina in this subject is very capacious, extending out almost to the pelvic wall. The terminal fifteen millimetres of the ureter are closely related to the fornix of the vagina.

The rectum fills up the posterior portion of the pelvis. The vagina and peritoneum are related to its anterior surface, while the ureter is only about six millimetres from its lateral border in the distended state of the bowel.

Pelvis XII.

Dissection to Display the Uterus and Parametric Tissues from the Posterior Aspect.

The posterior portion of the bony wall of the pelvis has been removed. A saw cut was made on either side through the sacro-iliac joints. The posterior portions of the iliac bones have been cut through and removed together with the sacrum and coccyx. The greater sciatic foramen is exposed on each side, while the posterior ends of the sacro-tuberous and sacro-spinous ligaments are cut through.

The *gluteus maximus* is seen on either side, its lower part forming the postero-lateral boundary of the ischio-rectal fossa. The fatty tissue of the ischio-rectal fossa is exposed, the *levator ani* muscle bounding it medially.

Medial to the *levator ani* is the rectum. The greater part of the bowel has been removed. From five to seven and a half centimetres of the lowest part of the bowel wall have been left in position. It was partially distended when the part was "fixed." The rectum is related to the *levator ani* muscle laterally and posteriorly, separated by a layer of fascia. Anterior to the rectum the fascia is thick and dense and is continuous from the fascia on one side of the pelvic wall to that on the other, forming a complete transverse septum between the rectum and the vagina, and bounding the "rectal channel" anteriorly. This layer is the recto-vaginal septum. It has been partially dissected up from its anterior relations and turned back. The uterus is drawn over to the right of the mid-line. It is post-menopausal, being about fifty millimetres in length and forty millimetres in width. It is somewhat irregular in outline, as it contains small fibroids. One small pedunculated fibroid has been removed from the posterior wall. The uterus is clothed by peritoneum posteriorly. This is continued on to the floor of the pouch of Douglas. Below the uterus the posterior wall of the vagina is displayed. On the left side the parametric tissue lying alongside the uterus and between the layers of the broad ligament has been displayed.

The vagina is in contact with the anterior surface of the recto-vaginal septum. There is a plane of loose connective tissue between the two structures by which they may be easily separated from one another. The vagina is drawn over to the right so that the parametrium on the right side is much less in width than it is on the left. As a result the ureter lies at a distance of forty millimetres from the vagina on the left side. In the parametric tissue are the blood vessels, nerves and lymphatics of the uterus and the vagina together with the ureter. The vessels are partly displayed.

The ureter runs down on the lateral wall of the pelvis under the peritoneum lying immediately in front of and parallel with the hypogastric artery. It then curves inwards and forwards to reach the base of the broad ligament. In the parametrium it is enclosed in a sheath of connective tissue which has been laid open to expose it. It disappears as it passes forward towards the lateral angle of the bladder. At this point it is forty millimetres lateral to the *cervix uteri*. This is due to the marked displacement of the uterus and vagina to the right. The distance between the right ureter and the cervix must be diminished correspondingly.

At the left uterine cornu the uterine tube and round ligament join the uterus. The left uterine tube is folded on itself and covers the left ovary. These structures have been drawn forward to display the structures between the layers of the broad ligament. On the right side the right uterine tube has been cut away fifteen millimetres from the cornu of the uterus. The small and shrunken right ovary may be seen in the angle between the back of the ligament and the pelvic wall.

Outside the peritoneum on the right side of the pelvis appear the psoas muscle, the external iliac artery and the hypogastric artery in that order

latero-medially. The commencement of the right common iliac vein appears behind and between the two arteries, while the right ureter, slightly dilated, lies immediately in front of the hypogastric artery. The pelvic connective tissue has been left undisturbed on the right side of the pelvis.

The bladder was found distended with urine. The upper part of the bladder has been removed and the interior displayed. Owing to the distension of the organ the peritoneal reflection has been carried up the wall of the pelvis for some distance. It can be seen above the *fundus uteri*.

Pelvis XIII.

Dissection of Pelvis from Anterior Aspect after Removal of Pubic Bones.

The anterior wall of the pelvis has been removed. The *mons pubis*, the anterior portions of the *labia majora* and the inner sides of the thighs were dissected away. The clitoris and the anterior portion of the uro-genital diaphragm were left undisturbed. A large segment of bone was then cut away. On the right side the line of section of the bone passes obliquely through the superior and inferior rami and the body of the right pubis, lying three millimetres in front of the anterior end of the right obturator foramen. On the left side the cut passes through the superior and inferior rami of the left pubis and the anterior end of the left obturator foramen. The piece of bone included between these cuts consists of the bodies of both pubic bones and the *symphysis pubis*. The dissection thus removed the anterior bony wall of the pelvis throughout the greater part of its extent.

Below, the *labia majora* are cut in section at a point approximately level with the *glans clitoridis*. They consist of loosely packed fatty tissue. Between the *labia majora* the anterior ends of the *labia minora* appear. Each *labium minus* divides at its anterior end into two portions. The medial ones unite to form the frenulum of the clitoris. They can be seen in the dissection. The lateral portions unite to form the prepuce of the clitoris. This structure arches over the *glans clitoridis* like a hood. In the dissection the prepuce of the clitoris has been removed and the *glans* is completely exposed. The deeper portions of the *labia majora* have been dissected away. As a result the inferior surface of the uro-genital diaphragm is displayed.

The uro-genital diaphragm is a dense structure which is firmly attached to the inferior rami of the pubis and ischium and to the lower border of the bodies of the pubes. The removal of the bony wall of the pelvis in its anterior part has displayed the uro-genital diaphragm where it forms the anterior part of the pelvic floor. There is a space of forty millimetres between the cut edges of the bone. This is bridged across by a strong layer of tissue varying in thickness from five to ten millimetres. This is the anterior portion of the uro-genital diaphragm. On either side the crus of the clitoris is attached to its inferior surface. Medial to the crus there is a space of from three to six millimetres, where the uro-genital diaphragm forms the roof of the superficial perineal pouch. Medial to this again is the bulb of the vestibule. This has a bluish appearance and is about ten millimetres in width. On both sides it tapers as it passes forward to become united with the *pars intermedia* and thus to link up with the body of the clitoris. The bulb of the vestibule closely embraces the lateral wall of the vagina. It lies in contact with the wall of the vagina for from three to five millimetres below the uro-genital diaphragm and it is two to three millimetres in thickness. Laterally the fatty tissue of the *labia majora* is bounded by the deep fascia of the thigh.

Anteriorly the body of the clitoris is formed by the union of the two crura and the *pars intermedia*. The clitoris is thirty-five millimetres in length from the junction of the crura to the tip of the *glans*. The *glans* is eight millimetres in length. The body of the clitoris measures thirteen millimetres antero-posteriorly at its widest part and it is nine millimetres in thickness from side to side.

Above the uro-genital diaphragm and between the cut ends of the bone the anterior surface of the bladder is displayed. On both sides the *arcus tendineus* of the pelvic fascia projects medially for ten millimetres. The *levator ani* muscle is arising from it. There is a space of twenty-five millimetres between the medial margins of the two *levator ani* muscles. This space is bridged by the uro-genital diaphragm which is the only support of the base of the bladder in this region. The *arcus tendineus* helps to support the bladder laterally. From the base of the bladder the urethra is running downwards and forwards to the vestibule. It pierces the uro-genital diaphragm lying about six millimetres behind the junction of the crura of the clitoris. It is surrounded by sphincter muscle and there is a thin sheath of connective tissue covering the vesical vessels which is reflected from the fascia covering the *levator ani* on to the base of the bladder laterally and from the superior fascia of the uro-genital diaphragm on to the base of the bladder anteriorly. Thus the base of the bladder and urethra are held in position and supported by their direct attachments to the uro-genital diaphragm which in turn suspends them from the bony wall of the pelvis. There is no evidence of any isolated ligaments running from the *cervix uteri* to the back of the pubes, the so-called "pubo-cervical ligaments"; these are really formed by the condensation of the pelvic connective tissue associated with the *levator ani*, the uro-genital diaphragm and the neuro-vascular bundle.

Above the level of the *arcus tendineus* the fascia of the *obturator internus* lines the pelvis up to its brim. The lateral wall of the bladder rests loosely upon it.

A dissection has been made at the base of the right broad ligament. The uterine artery and ureter are dislayed at the point where the uterine artery is crossing medially above the ureter to reach the side of the *cervix uteri*. The two structures cross at a

sharp angle and run almost parallel for a short distance in the base of the broad ligament before they cross.

A dissection has been made at the brim of the pelvis on both sides to display the ureter and its relation to the infundibulo-pelvic fold. On both sides the ureter enters the pelvis by crossing the external iliac artery at its commencement. It then runs down anterior to and lying on the hypogastric artery. The infundibulo-pelvic fold with its ovarian leash of vessels also enters the pelvis by crossing the external iliac artery. It runs down almost parallel with the ureter. On both sides of the body it is only five millimetres anterior to the ureter.

Pelvis XIV.

The pelvis has been sawn in median sagittal section. The right half has been partially dissected, the structures on the right pelvic wall behind the broad ligament having been displayed. The left half has been dissected from above and in front to display the structures between the layers of the left broad ligament and those in front of it.

XIV. A. Right Half (Dissection from Mid-Line).—(This dissection was prepared by the late Professor John Irvine Hunter in 1916, when he was Prosector in Anatomy.)

The section passes through the *symphysis pubis* and the sacrum and coccyx. The bladder and urethra are opened anteriorly. The uterus and vagina are opened behind the bladder and urethra. Posteriorly the anal canal and most of the rectum have been removed. A small portion of the wall of the rectum behind the pouch of Douglas has been left in position.

Below the *symphysis pubis* the body of the clitoris is displayed from the lateral aspect.

The bladder is partially contracted. Its wall is thick and muscular superiorly and anteriorly, but posteriorly it is much thinner. The vesical orifice of the urethra is cut in section. The urethral lumen can be seen for ten millimetres below the bladder. The lumen is surrounded by the thick, strong *sphincter urethræ*. The anterior wall of the bladder is separated from the posterior surface of the pubes by the cave of Retzius. The posterior surface of the bladder is separated from the *cervix uteri* by loose connective tissue which is about four millimetres in thickness. The base of the bladder behind the urethra is related to the anterior vaginal wall. Between the two is a plane of cleavage filled with loose connective tissue. The superior surface of the bladder is covered by peritoneum. This is carried out laterally on to the wall of the pelvis to form the lateral false ligament of the bladder. The peritoneum passes off the bladder posteriorly to reach the front of the uterus. Lateral to this it forms the anterior layer of the right broad ligament.

The vagina is about seventy millimetres in length on its posterior wall and about sixty millimetres on its anterior wall. It is collapsed from above downwards so that its passage is apparently shortened to thirty millimetres.

The uterus is thirty-five millimetres in length, but the cervix has been cut away below the point where the vaginal wall is reflected on to it. As a result the upper part of the vagina and the posterior fornix form a deep pouch. The body of the uterus is shrunken showing post-menopausal changes.

The uterine tube runs out laterally from the uterine cornu. It is only about thirty millimetres in length. The lateral extremity bears the fimbriated end which is very richly supplied with fimbriæ. Immediately behind the fimbriated end of the tube is a small hydatid of Morgagni.

The ovary is attached to the lateral border of the uterus immediately behind the uterine cornu by the ovarico-uterine ligament. The ovary is about forty millimetres in length and twenty-five millimetres in breadth. It is suspended from the side wall of the pelvis by the infundibulo-pelvic fold or suspensory ligament of the ovary. Note that the peritoneum is detached along the inferior border of the external iliac vein and turned forwards. This has carried the infundibulo-pelvic fold at least fifteen millimetres anterior to its normal position. It appears in the dissection to be twenty-five to thirty millimetres anterior to the ureter and hypogastric artery, whereas were it restored to its normal position by folding back the peritoneum it would lie only from five to ten millimetres in front of them.

Behind the broad ligament the peritoneum has been removed back to the mid-line. The structures on the lateral wall of the pelvis are displayed. The hypogastric artery commences at the pelvic brim and runs downwards and slightly backwards for thirty millimetres to divide into its anterior and posterior divisions. The uterine artery arises in common with the obliterated hypogastric artery and one of the vesical arteries. The uterine artery runs downwards, forwards and inwards to reach the side of the uterus. It is displayed throughout its length because the posterior layer of the broad ligament has been removed. The uterine artery is crossed at its commencement by the ureter, while near its termination it crosses superior to the the ureter about fifteen millimetres lateral to the *cervix uteri*. The internal pudendal artery arises just behind the origin of the uterine artery and runs down behind the ureter, lying between it and the hypogastric vein as it proceeds to the point where it leaves the pelvis. It disappears from view behind the upper margin of the *levator ani* muscle at the point where it is attached to the spine of the ischium.

The uterine veins are large and numerous. They join with the internal pudendal vein and the gluteal veins to form the hypogastric vein.

The ureter enters the pelvis by crossing the external iliac artery at its commencement. At this point it lies on the anterior surface of the hypogastric artery. It maintains this close relationship throughout the length of the hypogastric artery, lying medial to the external iliac vein, the obturator nerve and artery, the obliterated hypogastric artery and the uterine artery. It is now opposite the upper part of the great sciatic foramen. It runs downwards, forwards and inwards behind and almost parallel with the uterine artery until it reaches the base of the broad ligament

where at a point about fifteen millimetres lateral to the *cervix uteri* it turns forward and passes inferior to the uterine artery to run in the parametric tissue to the lateral angle of the bladder.

Behind the hypogastric vein the first, second and third sacral nerves are running outwards to join the sacral plexus. They are disappearing into the greater sciatic foramen over the upper margin of the *levator ani* and sacro-spinous ligament.

The medial portion of the *pyriformis* muscle can be seen arising from the anterior surfaces of the second and third pieces of the sacrum. The *levator ani* is arising from the spine of the ischium. Fibres may be seen forming a sharp margin as they pass back to the sides of the coccyx. The posterior fibres of the *obturator internus* may be seen lining the lateral wall of the pelvis behind the back of the broad ligament.

Below the vagina and pouch of Douglas the rectum and anal canal have been removed. The fat of the ischio-rectal fossa is displayed in this position.

XIV. B. The Left Half (Dissection from in Front and Above).—The peritoneum has been removed from the front of the left broad ligament, the upper surface of the bladder and the lateral wall of the pelvis. The pelvic connective tissue has been removed. On the lateral wall of the pelvis the external iliac artery and vein run along the brim. The *obturator internus* muscle covered by its fascia lines the pelvic wall. The obturator nerve, artery and vein are meeting in the obturator canal.

The uterus has been drawn over to the right of the mid-line. This has spread out the structures in the left broad ligament. The left uterine tube runs out for forty millimetres to its widely expanded fimbriated end which has been artificially fixed to the pelvic brim. Fifteen to twenty millimetres below it the ovarian leash of vessels is exposed, as it enters the broad ligament by means of the infundibulo-pelvic fold and runs in to the vicinity of the cornu of the uterus.

The uterine artery arises in common with the obliterated hypogastric artery. The latter is running forwards to the brim of the pelvis. The uterine artery is curving downwards, forwards and inwards to reach the base of the broad ligament. Here it gives off a vesical branch and turns directly inwards to reach the side of the uterus. It crosses superior to the ureter. At this point it is about twenty-five millimetres from the lateral border of the cervix. But allowance must be made for two factors, namely (i.) the pulling of the uterus to the right to display the structures and (ii.) the post-menopausal shrinking of the uterus. Immediately after it has crossed the ureter the uterine artery gives off a large vaginal branch.

The ureter may be seen running down on the front of the hypogastric artery to the point where the uterine artery arises. It then runs downwards, inwards and forwards parallel with and just behind the uterine artery till it reaches the base of the broad ligament. Here it turns forward, passes inferior to the uterine artery and runs forwards to the lateral angle of the bladder.

At the left cornu of the uterus the round ligament is arising just below and in front of the uterine tube. It is shown in the dissection raised above the pelvic floor and running outwards and forward to the region of the abdominal inguinal ring.

Pelvis XV.

Median Sagittal Section of Pelvis in Which the Bladder and Rectum are Distended.

The section is portion of a full length median sagittal section of a female body. Other sagittal sections were cut on either side of the mid-line, but none of them passed through the true pelvis.

The line of section is slightly to the right of the mid-line. The *symphysis pubis* and urethra have just been missed. In addition the uterus and vagina were asymmetrically placed, being displaced to the left. The line of section does not include the uterus on this account, but passes through the right fornix of the vagina and the right broad ligament close to the right border of the uterus.

The bladder was partially filled. It projects upwards into the abdominal cavity. In shape it is like an inverted pear. It rests on the back of the pubes and lies against the posterior aspect of the abdominal wall directly. The peritoneal reflection has been raised from the abdominal wall accordingly.

The rectum is distended. The lowest rectal valve stands out in strong relief. Owing to the distension of the bladder and rectum the vagina is displaced forwards. It has lost its normal obliquity of 60°. Its axis is now vertical.

In the substance of the broad ligament the uterine vessels appear in section. The uterine tube is also cut across.

Pelvis XVI.

Dissection of Pelvis of Full-Time Female Fœtus from the Perineal Aspect, to Show the Structures Superficial to the Uro-Genital Diaphragm.

As the parts were so small, both lower limbs were removed by disarticulation through the hip joints. There is a considerable amount of projection of the vulva in the new-born child. This is strongly brought out in this specimen. The object of the dissection was to determine the position and value of the uro-genital diaphragm or triangular ligament at this stage.

The uro-genital diaphragm is just as definite and comparatively as strong in the new-born child as in the adult. It may be seen in the dissection attached throughout the length of the rami of the pubis and ischium. The base of the diaphragm is clearly marked and shows a crescentic curve. The fibres of the *levator ani* are shown emerging from beneath it. Medially the diaphragm is attached to the wall of the vagina and the perineal body. The perineal body is proportionately longer in the full-tmie fœtus than in the adult.

It is to be noted particularly that the uro-genital diaphragm does not run transversely from one ramus to the other. It is dependent from the ischio-pubic ramus at an angle of from 70° to 80° with the horizontal.

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Reports of Cases.

PURPURA HÆMORRHAGICA.

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FULMINATING *purpura hæmorrhagica* occurs with such a variety of visceral complications that the following case which manifested an unusual number of them, is worthy of record.

Mrs. B., aged 59, was seen on the morning of September 7, 1926, complaining of violent headache and of nausea. On the preceding day she had enjoyed a motor run and had partaken along with several other persons of a meal of veal brawn. Her illness rapidly became worse and when seen in the evening of the same day she was vomiting, had a temperature of 39·4° (103° F.) and a pulse rate of 140; the pulse pressure was noticeably feeble.

On the morning of the second day of her illness the skin over the whole of her body was found to be occupied by numbers of subcuticular extravasations of blood ranging in size from the smallest petechiæ to large eccymoses; the distribution seemed to obey no rule. The left pupil was fixed and there was a dimness of vision in that eye.

The patient complained loudly of pain in all her joints more particularly in her wrists which soon became hot and swollen.

The systolic blood pressure was very low—in the region of 45 millimetres of mercury, the ankles pitted on pressure and the urine contained a trace of albumin.

Thirty cubic centimetres of antistreptococcal serum were injected intravenously—the punctured vein did not bleed unduly. Her general condition gradually improved though the joints remained stiff and painful during the whole of the convalescence.

About the sixth day she complained of a lump in her wind-pipe which caused her much discomfort and cough.

On the seventh day the skin over the ecchymoses necrosed and sloughed out leaving a number of deep ulcers, of which samples may be seen in the accompanying illustration. The largest of these penetrated a distance of fully 2·5 centimetres (one inch).

On the tenth day her nose bled for a few moments and at the end of the third week the skin of palms and soles desquamated.

Comment.

Our knowledge of the ætiology of this variety of purpura is very scanty. The picture presented by this patient was that of someone acutely poisoned, as by snake venom.

The vomiting, headache and notable fall of blood pressure are reminiscent of histamine poisoning. The source of this might have been the veal brawn, but no confirmation was offered by other participants suffering.

The temperature chart gives no useful clue. An initial rise occurred and this could have been caused by reaction to any one of a number of processes; a second rise in temperature was due to the suppuration of the ecchymoses.

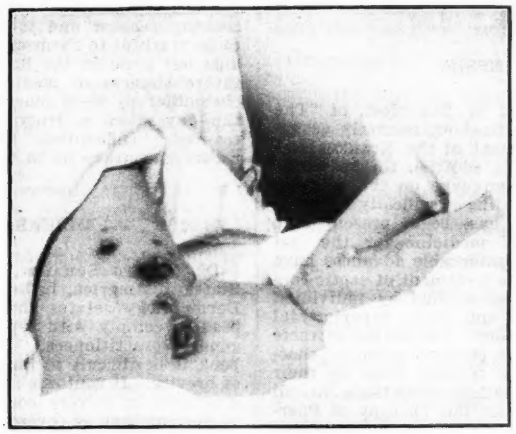

FIGURE.
Showing Ulcers Resulting from Necrosis of Ecchymoses in Dr. Shannon's Patient.

RODENT ULCER OF THE LOWER EYELID TREATED BY DIATHERMY.[1]

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A FEMALE patient, married, aged forty-five years, was first seen in the Ophthalmic Out-Patients' Department in August, 1925, with a rodent ulcer involving the lower eyelid. She was referred for treatment by X ray therapy and eight to ten treatments were given. The cartilage of the lower lid became involved and X ray treatment was discontinued. She was then transferred with a view to treatment by diathermy.

At this stage the ulcer had involved slightly more than the middle third of the lower lid margin and extended into the whole thickness of the lid below this for six millimetres at its greatest depth.

On May 14, 1926, the patient was anæsthetized and diathermy was applied to the whole area affected, the resulting area treated appearing as a triangle with its base upwards. Following this there was some conjunctival reaction for a few days; the area treated sloughed and the part healed. When healed there still remained a thickened, suspicious region in the centre of the area treated and on July 2, 1926, the patient was again anæsthetized and this area thoroughly dealt with.

[1] The patient described herein was shown at a meeting of the New South Wales Branch of the British Medical Association on October 14, 1926.

Complete healing occurred within six weeks. In the area treated there can be seen a scar and except for a very slight ectropion, extending over a few millimetres, the whole of the lower lid remains closely applied to the eye. The lower *punctum lachrymale* is slightly everted. There is no epiphora.

It is suggested that diathermy represents the ideal method of treatment in these cases, the growth is effectively dealt with, the after results and cosmetic results are good, there is no necessity for plastic repair and recurrence is immediately manifest as it is superficial. The results of excision are not good; while the growth can be thoroughly extirpated by this method, neither the after results, nor cosmetic results are satisfactory in the great majority of cases. After excision it is difficult or impossible owing to the presence of the cartilage in the lid to bring the margins together without leaving a V-shaped notch over which epiphora occurs and at the site of which another rodent tumour developes. In this particular region radium or X ray therapy does not appear to be ideal. They frequently cause a superficial healing with rapid deep extension into the tissues of the orbit. The patient, being misled by this superficial healing into thinking that the condition is cured, neglects further treatment. Further the results of X ray therapy and radium, when the cartilage is involved, are not so good as when the skin only is involved.

Reviews.

PUERPERAL SEPSIS.

THE American edition, prefaced by Ehrenfest, of "The Therapy of Puerperal Fever" by Koehler, formerly assistant of the Gynæcological Department of the Krankenhaus Wieden, Vienna, makes a valuable addition to the works already existing in the English language on the subject.[1] It is pointed out that no work dealing specifically with the problem of puerperal infection has been presented to English-speaking practitioners of medicine for the last fifteen years. In the meantime considerable advances have been made in the knowledge of the treatment of septic conditions. This knowledge has been applied by individual obstetricians to puerperal sepsis and much experimental work has been done in the laboratory. The author attracts attention to the truism that "the positive value of theoretical propositions stands in an inverse ratio to their number" and the "multiplicity of contributions in all languages of the world dealing with the Therapy of Puerperal Infections is an evidence of failure to solve the problem."

Thoroughness has been shown throughout and for the sake of completeness methods of treatment are mentioned only to be discarded. After giving a summary of the methods of different schools, the author gives his own conclusions with special reference to individual cases, experiments and pathological examinations, so that the pages throughout carry the imprint of the master mind. The references to the investigations and methods of different workers are necessarily short, but an extensive and carefully arranged index to the literature on the subject will be not the least valuable part to those striving to help to reduce a mortality and morbidity that still shames the medical profession.

The first chapter is devoted to prophylaxis. In this connexion the author refers specially to rectal examination, a method which has not received the attention it deserves.

The bulk of the book, however, is devoted to therapy and a careful review of methods in use in various clinics in the world is given.

Passing reference is made under the general heading of "Rœntgenisation," to the beneficial effects recorded in favour of treatment by quartz and uviol lamps ("or artifical sun"). It is common knowledge in this country that patients suffering from puerperal infections make much more rapid progress when treated in the open air, than when housed indoors.

The vexed question of removal of placental rests is discussed, as well as other methods of local therapy, including drainage, suction, disinfection, packing *et cetera*. The section on surgical therapy is devoted chiefly to the history of the place hysterectomy has held in treatment, and to a full account of the indications for ligation of veins with details of technique and some tabulated results. Trendelenburg published his first successful case of ligation in 1902 and the operation does not seem to have gained much favour with surgeons in the interval. Indeed, the chief difficulty seems to be to decide what constitute indications for operation and there is uncertainty in regard to the extent of the process of thrombosis and how far the thrombosis may be complicated by phlebitis and periphlebitis.

A great number of antiseptics have been used, administered intravenously or by subcutaneous or intramuscular injection. These range from the older bichloride and formaldehyde preparations to the newer "Mercurochrome," quinine and arsenic derivatives and colloid metals. The pages devoted to these medicinal treatments are made the more valuable by the definite instructions as to usage and the report of cases in which treatment has been adopted.

Treatment by vaccines, serum and foreign proteins, occupies many pages. The author concludes his exhaustive study with the statement that "a rational therapy of puerperal fever is seemingly still an unsolved problem. Only a relatively small percentage of these unfortunate women actually recover and if medical practitioners are willing to be truthful to themselves, they must admit that therapy aids but little in the happy outcome." He adds that the future chances of medicinal treatment and especially of chemotherapy seem more helpful and he looks forward to the day when a truly ætiological remedy may be discovered. "Difficulties," he says, "must not discourage, but rather encourage us in the effort to overcome them."

[1] "The Therapy of Puerperal Fever," by Privatdozent Dr. Robert Koehler; American Edition prepared by Hugh Ehrenfest, M.D., F.A.C.S.; 1925. St. Louis: The C. V. Mosby Company. Royal 8vo., pp. 276, with illustrations. Price: $4.00 net.

DISEASES OF THE SKIN.

DR. ALFRED SCHALEK, of Nebraska University, United States of America, in his preface to his "Fundamentals of Dermatology" states that his purpose in writing it has been to comply with repeated requests from students and general practitioners.[1] What use they will find for this book it is difficult to imagine. It certainly has the quality of brevity. It contains an alphabetical list of skin diseases described in a very concise form and the whole subject of dermatology is covered in two hundred and forty pages with fifty-four illustrations.

The author also states that an exhaustive review of therapeutics has had to be omitted. In this book the methods of treatment are too briefly mentioned, certain important diseases are treated very scantily even for a work of such size and reference to differential diagnosis is frequently missing.

The section on perforating ulcer of the foot is of little value, it is apparently considered a dermatological entity and the sole cause is given as "degeneration of the sensory nerves supplying the affected parts" and the treatment suggested is: "surgical measures are usually necessary and amputation may have to be resorted to." This section alone both in its composition and its teaching does not serve to recommend the book. The classification of syphilis as a new growth is unusual even if it be considered as a granuloma. In the next line it is described as a chronic infectious systemic disease.

Two pages of dermatological aphorisms, however, are well worth reading and the usual preliminary introduction on the anatomy and physiology of the skin is well arranged.

On the whole this compendium may be of use to such students as have no higher aim than a mere smattering of knowledge for examination purposes or perhaps to those who write for the health columns of newspapers.

[1] "Fundamentals of Dermatology," by Alfred Schalek, M.D.; 1926. Philadelphia: Lea and Febiger. Post 8vo., pp. 250, with illustrations. Price: $3.00 net.

The Medical Journal of Australia

SATURDAY, FEBRUARY 12, 1927.

The College of Surgeons of Australasia.

DURING the sessions of the Australasian Medical Congress (British Medical Association) at Dunedin the College of Surgeons of Australasia will become an established institution. In June last an account was published in these columns of the steps taken by the originators of the idea and the reasons that had impelled them to take these steps. Meetings of the Founders of the College of Surgeons of Australasia were held in Sydney in August last and a full account of their deliberations was published in this journal on January 22, 1927. The objects in view are "to cultivate and maintain the highest principles of surgical practice and ethics, to safeguard the welfare of the community by indicating that its fellows have attained a high standard of surgical competency and are of a high character, to educate the public to recognize that the practice of surgery demands adequate and special training, to promote the practice of surgery under proper conditions by securing the improvement of hospitals and hospital practice, to arrange for adequate post-graduate surgical training at universities and hospitals, to promote research in surgery and to bring together the surgeons of Australia and New Zealand periodically for scientific discussion and practical demonstration of surgical subjects." Although these objects imply that there is urgent need for the improvement of the standard of surgical practice and for the raising of the dignity and ethical conduct of surgeons, the movement is not intended to cast reflections on the surgeons of Australasia as a body. In every country and particularly in the various parts of the British Empire and in the United States of America surgeons have realized the necessity of some authority to regulate practice and to prescribe the rules of conduct. It is obvious that the statutory bodies charged with the keeping of the medical registers cannot be endowed with powers to fulfil the functions enumerated above, for the medical Acts deal merely with registration and deregistration is an extreme penalty for a very serious offence. The British Medical Association has done a very great deal to define correct professional behaviour and to codify rules of medical ethics. If a medical practitioner offend against these rules, he can be deprived of the privileges of membership of the Association or he may be censured by his colleagues. But the British Medical Association does not endeavour to regulate practice. Its constitution is laid on too wide a basis for the adequate discharge of such a function. It remains for a special body to be created to assume authority and to exercise control. The genesis of such a body is of some importance. In England the Royal College of Surgeons came into existence when the conditions of surgical practice were quite different to those obtaining today. In 1754 the guild of the barber-surgeons having failed to serve a useful purpose, was replaced by a company specially incorporated by Act of Parliament. This company licensed young men to become apprentices to surgeons or surgeons' mates. It was an ungovernable institution and is said to have committed suicide at the early age of about forty by holding informal courts. In 1800 the remnant of the company reconstituted itself under the name of the Royal College of Surgeons. It gained the right to grant diplomas under its charter and it gradually assumed an ultraconservative autocracy which persist to this day. Its utility as a corporate body with power to grant diplomas entitling the holders to practise and higher diplomas as indications of the acquisition of special knowledge of surgery is unchallenged. Moreover, its museum and its library are of world renown. As a disciplinary authority the Royal College of Surgeons of England is a dismal failure. The other Royal Colleges of Surgeons have arisen in the distant past under similar circumstances and enjoy statutory recognition as licensing institutions. The American College of Surgeons is a modern corporation and owes its existence to the action of some earnest and enterprising surgeons who found that the conditions of surgical practice in the United States were deplorable and determined to remedy all the defects by a fearless policy of reform.

The origin of the idea that has led to the election of the Founders of the College of Surgeons of Australasia and to the drafting of the constitution and bond is difficult to trace. It must have occurred simultaneously to many prominent practitioners. We read that the delegates were nominated at meetings of surgeons and specialists and had signified their consent to act as provisional foundation members. The actual initiators of the idea discussed the question long before any meetings were held. At the Australasian Medical Congress in Brisbane in 1920 Professor L. Barnett brought the idea into open discussion and intimated that surgeons who had or who were about to retire, had selected honorary surgeons of large hospitals and surgeons of eminence to undertake the preliminary work. There was no undue hurry. The desirability of the establishment of a college and the main principles on which the objectives of the college should be based, appealed to all. Those who were approached, felt that a voluntary body must be started by voluntary action and accepted the charge. It will be noted that Sir George Syme, the surgeon who by common accord is recognized as leader in Australia, favours the institution of a voluntary association of individuals bound by a pledge, but looks into the future when this body shall have gained the respect and recognition of the whole profession and of the community and anticipates that it may then seek incorporation under one of the companies Acts or possibly under a Royal Charter. It is probable that he had in mind the possibility that in these circumstances the College of Surgeons of Australasia might hold examinations and grant higher diplomas in surgery which would be recognized for registration purposes by the legislature.

The confidence which the new College of Surgeons must awaken, will depend on the manner in which those entrusted with its management work for the attainment of the objects. The regulation of surgical practice has to begin in the larger public hospitals where a control is possible and where a high standard should obtain. With so powerful a lever as the right to grant or to withhold admission of surgeons to fellowship much can be attained. Gross deficiencies and grave shortcomings should cause no difficulty. The greatest caution and diplomatic handling of men may be necessary to eliminate the less obvious failures. We feel convinced that the College will succeed in raising the standard of surgical practice, in rendering the service of surgeons more valuable to the public and in advancing knowledge in surgical pathology and clinical surgery. The constitution of the College gives emphasis to the interests of the patient being paramount and indicates that integrity, the acquisition of knowledge and technical skill and the recognition of the rights of the patient are more essential than the collection of large fees.

The College of Surgeons of Australasia has a great task to perform and an open field for the attack. May it prosper.

Current Comment.

IMMUNIZATION AGAINST DIPHTHERIA.

DURING 1925 7,871 cases of diphtheria were notified in the Commonwealth of Australia. The number of deaths was 273. Attention has frequently been drawn in these columns to the fact that attempts to reduce figures such as these by the application of the Schick test and toxin-antitoxin immunization are but half-hearted. Moore showed in the Bendigo experiment that results can easily be obtained in Australia. From time to time the Schick test receives passing mention in one or other of the reports emanating from the Health Departments of the several States. In other parts of the world a great deal has been done in regard to immunization against diphtheria. The work has been carried out on such an extensive scale that it has been possible to lay down certain principles necessary for the production of the best results.

Possibly the leading authority on immunization against diphtheria at the present time is Dr. W. H. Park, of the Health Department, New York, the first to use toxin-antitoxin for this purpose. Dr. Park has recently given a useful review of the present state of knowledge in regard to this question.[1] His statements about the Schick test are founded on the results of one million tests made during the last thirteen years. The first point of importance in carrying out the test is the question of dosage. If sufficient antitoxin is present in the blood to produce immunity in the individual, there will be sufficient in the skin to neutralize the standard dose of toxin. Thus when the test is performed, sufficient toxin must be injected to cause irritation if insufficient antitoxin is present. Moreover, the amount of toxin given must not be excessive, for a large dose would cause irritation under any circumstances. It

[1] *American Journal of Diseases of Children*, November, 1926.

has been found that the proper dose of toxin is one-fortieth of the amount that would kill a guinea pig weighing two hundred and fifty grammes, given in 0·2 cubic centimetre of salt solution. Dr. Park gives details as to the method of injection of the toxin and points out that errors may readily creep in and he adds that he has never seen undoubted clinical diphtheria occur in a child who had recently failed to react to the Schick test when the test was carried out by an expert.

An attack of diphtheria is sometimes followed by production of antitoxic immunity and sometimes it is not. When mild attacks occur, the children have a certain amount of antitoxin in their blood, but not enough to prevent a local infection. These respond quickly to the absorbed toxin and produce considerable amounts of antitoxin within a few days. A severe attack of diphtheria indicates a lack of antitoxin in the blood before the attack. About one-half of the children thus affected will produce antitoxin in about two months, the remainder will never do so.

An important question raised by Dr. Park is in regard to the conditions under which the Schick test should be carried out on children prior to the use of toxin-antitoxin for purposes of immunization. Two main points should be considered in this connexion, the age group and the density of the population. Children under five years of age are generally susceptible and should not be subjected to the Schick test before receiving the three injections necessary for immunization by toxin-antitoxin. In the older children the place of residence is of great importance. Children resident in the city as a rule become immune at an earlier age than those in the country. In the country as a rule the Schick test has not been used, but in the cities it has. Dr. Park has been using a modification of the Schick test for the children in New York. In this method he gives one cubic centimetre of the standard preparation of toxin-antitoxin subcutaneously. If the injection is given just beneath the skin, it will serve as an immunizing injection and at the same time will reveal whether the child is susceptible or not. The method has been used with success in more than fifty thousand school children and has been found of most use in children before the school age has been reached. Among older children and adults a reaction somewhat similar to that of the Schick test appears. This is due to the protein in the solution. It occurs in about 5% of cases. To remove all doubt it is necessary to give a control injection of heated toxin in another spot. The heat destroys the toxin, but leaves the protein unaltered. This control test should be used in all children over six years of age. If the control test is not made, immunization should be carried out on all those whose response to the Schick test has been doubtful.

The other points discussed by Dr. Park include the treatment of an unprotected child exposed to infection by diphtheria. If the child is under the age of six years, a subcutaneous injection of one thousand units of antitoxin should be given at once and it will then, of course, be useless to carry out the Schick test. In older children also this should be done if the exposure has been great. After immunization has been attempted by the use of toxin-antitoxin, a Schick test may with advantage be carried out after three or four months. Dr. Park also lays stress on the necessity for testing and immunizing doctors and nurses in attendance on patients suffering from diphtheria. In all cases if the response to the Schick test has been severe, the reaction to the toxin-antitoxin mixture will probably be pronounced and the latter should be given in half doses together with an additional dose. In conclusion it may be pointed out that in over one million injections of toxin-antitoxin no permanent harm has resulted to any child. Several deaths have occurred in cities other than New York when wrong mixtures have been used. With care these can be avoided. Although immunizing injections of antitoxin produce sensitization, there is no evidence which will allow Dr. Park to conclude that this sensitization produces a change which makes later injections of the serum dangerous. Reactions with a rash and elevation of temperature may occur, but these are transient.

Such are the main conclusions reached by Dr. Park. They are worthy of careful study by Australian practitioners. Small communities, such as are found in country districts in the Commonwealth, are particularly suitable for work of this kind. A great deal has been talked and written about co-operation between departments of health and the general practitioner. The onus is generally made to rest on the latter. Departments of health are neglecting this method of handling the diphtheria problem or at any rate are not exploiting its possibilities to the full. There is no reason why the general practitioner should not initiate the work when occasion arises. A health department could not very well refuse a direct and specific appeal for assistance.

VENTRAL HERNIA.

In the issue of the journal of March 28, 1925, reference was made to a method of hernia repair adopted by Mackenzie and applicable to herniæ of the lower part of the abdominal wall. It consisted in the reflection of the *tensor fascial femoris* muscle from each thigh and in swinging them across the front of the abdomen. Dr. O. F. Lamson has recently reported a case in which he repaired an abdominal wall at the site of a ventral hernia resulting from several operations on the gall bladder.[1] The right rectus muscle had been destroyed at this point and it was impossible to bring the tissues together. The anterior fascia from the left rectus muscle was dissected in a flap and folded across to fill in the gap. The result was satisfactory. It is obvious that a procedure of this nature is a desperate measure and the question of the weakening of the sound side must be considered. Dr. Lamson holds that the normal muscle on the sound side remained sufficiently supported, but does not draw general conclusions from one case.

[1] *Surgery, Gynecology and Obstetrics*, September, 1926.

Abstracts from Current Medical Literature.

BACTERIOLOGY AND IMMUNOLOGY.

Method of Cultivating Entamœba Histolytica.

CHARLES F. CRAIG (*American Journal of Tropical Medicine*, September, 1926) describes a method for the cultivation of *Entamœba histolytica*. The medium is easily prepared and amœbæ have been cultured from fæces in chronic infections and from carriers. The medium consists of Locke's solution to which is added inactivated blood serum. The Locke's solution is as follows: Sodium chloride, nine grammes; calcium chloride, 0·24 gramme; potassium chloride, 0·42 gramme; sodium bicarbonate, 0·2 gramme; dextrose, 2·5 grammes; distilled water, one thousand cubic centimetres. The solution is filtered and autoclaved at fifteen pounds pressure for fifteen minutes and allowed to cool. One part of the activated blood serum is added to each seven parts of the solution. The mixture is well filtered after shaking, the filtering being done through a Mandler or Berkefeld filter. Five to ten cubic centimetres are placed in tubes, tested for sterility and kept in the incubator at 37° C. until used. The reaction does not require adjusting. Human serum yields the best results so far as the number of amœbæ in cultures is concerned. The medium is inoculated by placing a large loopful of the fæces to be examined in the medium and breaking it up thoroughly with the inoculating loop. The inoculated tubes are placed in the incubator and examined at the end of twenty-four hours. The amœbæ will be found in the sediment at the bottom of the lungs. They are longer and more active when cultivated in this medium and the amœbæ have remained alive and motile for eleven days.

The Causal Organism in Ozæna Fœtida.

ALEXANDER MICHAELOFF (*Bulletin of the Johns Hopkins Hospital*, September, 1926) records the results of an investigation into the causal organism in ozæna. Twenty-eight cases were studied with a view to establishing the Perez bacillus as the pathogenic agent of this condition and to compare it with the typical *Proteus vulgaris*. Perez in 1899 described the bacillus recovered by him in seven out of eleven cases as the "*Coccobacillus fœtidus ozænæ*." The bacillus is non-motile Gram-negative, pleomorphic; it grows well in all ordinary media and produces the characteristic smell of ozæna especially in infusion broth. It forms indol, does not liquefy gelatin or coagulate milk. It is pathogenic for white mice, guinea pigs and rabbits. The author recovered this organism in seven out of the twenty-eight cases. The percentage of isolations is smaller than that of other workers probably because only strains pathogenic to rabbits were studied. Many species of bacilli are found in ozæna discharge, some common inhabitants or secondary invaders. The *Bacillus proteus* or the Perez bacillus are the most common. The latter was recovered by inoculating some of the nasal discharge into tubes containing ten to fifteen cubic centimetres of infusion broth. After twenty-four hours all tubes inoculated were opened and those giving the characteristic odour were plated on Drigalski or infusion agar. Four cubic centimetres were also inoculated subcutaneously into rabbits. All strains recovered were Gram-negative, non-motile and without capsules or spores. The usual form was found to be a short bacillus with a few cocco-bacilli and some larger filamentous forms. Motility was not general. Cultural characteristics, agglutination tests, complement-fixation tests, flocculation tests, pathogenicity and toxicity were all studied and the author came to the conclusion that it is justifiable to regard the Perez bacillus as a member of the large proteus group which has lost some of its fermentative properties. The frequent occurrence of the Perez-Proteus group in *ozæna fœtida* and the specific odour found in cultures of these organisms show that it is involved in the pathogenesis of this condition as producing the fœtor, discharge and ulceration; but whether it is primarily or secondarily concerned is still a matter of uncertainty.

Immunity to the Pneumococcus.

VICTOR ROSS (*The Journal of Immunology*, September, 1926) reports the result of the oral feeding of Type I. pneumococci to rats. When small quantities of the organisms were used, twenty-four hour cultures were added directly to cracker meal and placed in the cage with the rat several hours after all food had been removed. When larger quantities were employed the culture was centrifugalized and the bacteria were suspended in small quantities of 0·1% gelatin solution, cracker meal was added and the whole was thoroughly mixed. At no time was any ill-effect noted, the animals increasing in weight at the usual rate. The resistance of the rats was tested by intraperitoneal injections of a twenty-four hour broth culture of pneumococcus Type I. The volume injected was usually 0·2 cubic centimetre. The degree of protection was found to be as good as that obtained when rats were fed on tissues of animals killed by the pneumococcus. The author suggests that the production of an immunity against the types in the mouth explains the fact that Types III. and IV. pneumococci, most frequently found in the mouths of healthy adults, are least frequently found in the blood or sputum of patients suffering from pneumonia.

Experimental Syphilis.

JAROLD E. KEMP, ALAN M. CHESNEY AND ALLAN K. POOLE (*Bulletin of the Johns Hopkins Hospital*, September, 1926) investigated the Wassermann reaction in normal and syphilitic rabbits and report the result of two thousand six hundred and eighty tests performed on approximately nine hundred different rabbits. In seven hundred and fifty tests performed on the serum of six hundred rabbits prior to inoculation a reaction was obtained in two animals, an incidence of 0·3%. Both these animals were obtained from the same dealer at the same time and the tests were performed within a few days of their arrival at the laboratory. The serum of both these animals contained anticomplementary substances at this time, but on being retested two weeks later the serum yielded no reaction and the anticomplementary substances had diminished. It was suggested that previous diet may have contributed to the transient reaction. Earlier observers have suggested that one of the main causes of false reactions in normal rabbits is the presence of the various infections to which these animals are susceptible. In the authors' series tests were carried out on fifty-two animals with severe snuffles, subcutaneous abscesses or coccidiosis, but in none was a reaction obtained and the subsequent behaviour of the reaction in these animals after infection with syphilis was in no wise different from that exhibited by other syphilitic animals. Eight rabbits were inoculated with tuberculous material and seven with *Streptococcus erysipelatis*, but none yielded a reaction with the Wassermann test. The serum of eight hundred and twenty-five rabbits, injected with syphilis, was examined by the Wassermann test. In most of the animals the intratesticular route for inoculation was used, in others the virus was applied to the exposed surface of a fresh or granulating wound. In every instance a reaction was obtained, if a lesion at the site of inoculation developed. In testicular inoculations a reaction did not appear as a rule until there was clinical evidence of orchitis, although it may appear as early as two days after the first clinical sign of infection in the testis. The reaction was found to disappear spontaneously about one hundred days after inoculation and to remain absent. Transfer to normal animals of popliteal lymph glands from animals which subsequently failed to yield a reaction, gave rise in every animal tested to infection, indicating that absence of a reaction in the rabbit does not exclude latent syphilitic infection. The behaviour of the reaction in rabbits inoculated through wounds did not differ materially from that obtained in those submitted to intratesticular inoculation. The incubation period was rather longer in cases of wound inoculation and the intensity and duration of the reaction were found to be proportional to the size of the lesion produced. Operative removal of the primary focus of the disease was found to result in failure to produce a reaction or in postponement of its appearance. Treatment with "Arsphenamine" in doses of ten milligrammes per kilogram administered

intravenously led to failure to produce a reaction. In very exceptional cases it led to a provocative reaction. When treated animals were successfully reinfected with or without the production of a lesion at the site of inoculation, a reaction was produced in a large proportion of cases.

HYGIENE.

Skin Diseases in an Industrial Clinic.

DERRIC C. PARMENTER AND SUZANNE DUBBENILH (*The Boston Medical and Surgical Journal*, April, 1926) set out to discover what the incidence of diseases of the skin might be in a purely industrial clinic. Accordingly a study was made of five hundred and thirty-two patients with diseases of the skin, coming to the Industrial Clinic at Massachusetts Hospital over a period of three years. During that period four thousand eight hundred and seventy patients were referred to the Industrial Clinic, so that one patient in every nine was affected with a skin disease. These patients were classified according to the type and the causation factors of the disease. As a result of this the authors were able to show that (i.) during the three years only one in nine of the patients coming to the Industrial Clinic presented skin disease conditions; (ii.) the largest group of these conditions, more than one-third, was diagnosed as dermatitis and eczema; (iii.) eighty-six persons or one-third of those considered had been engaged less than nine months in the occupation followed by them at the time the disease occurred; (iv.) the summary of causative factors recognized as contributing to the diseased condition revealed that one hundred and forty-seven cases were of recognized industrial origin except possibly twenty-one (epidermophytoses) which were scattered through the different groups; (v.) if employers and workers were better acquainted with the various occupations which could produce diseases of the skin, precautions might be taken which would enable wage earners to escape discomfort and even incapacity.

The Health of the School Teacher.

FRANK SMITH (*The World's Health*, July, 1926) states that in spite of the enormous progress that has been made during the last fifteen years in the medical care and treatment of school children, very slight attention has been paid to the problem of the teacher's health. It is difficult, he says, to estimate illness and the only means of doing so at present is by taking the time actually lost in the teacher's attendance at school. That these absences do not reveal the whole truth will be generally admitted, but it is also established that the industrial worker is often at his work when suffering from serious ill-health and so a comparison is not unfair. Statistics show that in industrial workers (over a period of eight years) the annual loss of time is 5·28 days for each man and 6·72 for each woman. In the teaching profession it is 4·6 days of illness per year in men and 8·7 days in women. The figures in short establish the interesting fact that the teacher loses as much time through illness as the worker in industry. Many teachers pass a medical examination before they are admitted to the profession and moreover they enjoy a fairly high standard of comfort, suffer less from exposure and changes of temperature than most industrial workers, they are confined for relatively short periods and the risks that arise from the nature of their occupation, are comparatively small. Furthermore they have as many weeks' holiday as the industrial workers have days and far greater opportunities for rest and recreation than other classes. These facts would lead to the view that the teachers would lose much less time through sickness than the industrial workers. The fact that the figures are so similar is an indication of the unhealthiness of the teachers' work. Further investigation shows that the illnesses which cause absence among teachers are trivial and the author points out that the only ways to reduce these illnesses are (i.) to demand a much more rigorous standard of fitness among all entrants to the profession, (ii.) to make the school buildings more hygienic and up to date, also to reduce the size of classes under the supervision of the teacher.

Dust Inhalation by Hematite Miners.

A. J. CRONIN (*The Journal of Industrial Hygiene*, July, 1916) points out that a branch of the study of the pneumonoconioses which has received slight attention, is that centring around the inhalation of hematite dust by machine drillers in iron ore mines. Working in the iron ore fields in North Lancashire, the author first inspected all varieties of working places, saw the different types of machines in action and observed the various methods of drilling. He noted that wet drills give rise to no dust, but on the other hand dry drills (the main type of drill employed) give rise to an intense dust which is blown directly back into the face of the operator. Even when artificial ventilation by exhaust fans is provided the atmosphere breathed by the driller is heavily charged with dust. Analysis goes to show that the silica present in this dust is present as such and not as a silicate, while the iron is present as a sesquioxide. In making observations as to the effects of the dust inhalation one hundred drillers chosen from all over the area and sixteen non-drillers (men not exposed to dust) were chosen. These were carefully interrogated and clinically examined. The medical history of the drillers was particularly clear, some having been at work for thirty years without a day's illness. No complaint at all was made as to symptoms by 27% of the men, but a large number admitted to irritation of the nose and throat during drilling, permanent cough as a symptom was not found. By far the most constant of the permanent symptoms was shortness of breath, an admission often made by young men. This shortness of breath on exertion, however, was much in excess of the normal and was not to be explained by symptoms of cardiac insufficiency nor was it correlated with symptoms of other lung diseases such as asthma, bronchitis or emphysema. Symptoms indicative of pulmonary tuberculosis were constantly lacking. Clinical examination in 30% showed loss of ability to expand the chest fully, some slight flattening in the infraclavicular hollows and a percussion note in many cases generally duller and less resonant than normal. None of the controls made complaint of any adverse symptoms resulting from underground work, in no case was shortness of breath complained of and in no case did physical examination of the chest reveal a departure from the normal. In conclusion the author adds some pathological deductions: (i.) The inhalation of hematite dust produces certain tissue changes in the lungs of iron ore drillers. (ii.) Such changes are not localized but are generalized or diffuse throughout both lungs, although the apices are perhaps more affected than the bases. (iii.) These tissue changes do not give rise to pulmonary diseases such as asthma, bronchitis, pneumonia and pulmonary tuberculosis, which commonly result from dust inhalation, but produce the symptom complex already described.

Syphilis in Industry.

WILLIAM ALFRED SAWYER AND BENJAMIN J. SLATER (*Journal of Industrial Hygiene*, August, 1926) affirm that industry offers a rich field for the study of syphilis, for it is here that an opportunity is presented to study the individual from day to day and from year to year in relation to his daily work. During the last three years they have carried out Wassermann tests on the blood of 3,447 persons. They point out that it is not their policy to discharge a man who has syphilis, for if such were the case, it would soon be well nigh impossible to get consent for the carrying out of a Wassermann test from any employee. Every encouragement and assistance are given the employee to get treatment as quickly as possible and at rates compatible with his financial position. As a result of their work over a period of three years the authors have come to the conclusion that it is possible with a proper technique to obtain many Wassermann reactions in industry with comparative ease and that a perfect follow-up system is possible as long as the employee continues his employment. Early treatment of syphilis is the best preventive of complications following accidents and periods of disability are thus cut down. There is further a reduction in sick benefit payments for the same cause. Of the 3,447 specimens of blood tested 4% yielded reactions.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE SECTION OF OBSTETRICS AND GYNÆCOLOGY OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the B.M.A. Building, 30-34, Elizabeth Street, Sydney, on September 29, 1926, DR. R. WORRALL in the chair.

Surgical Practice Abroad.

DR. CRAWFORD ROBERTSON read a paper on surgical impressions gained in Paris and London. He said that in the path of busy medical practice there was a tendency for a surgeon to become fixed in his ideas and stereotyped in his methods. Travel to other lands and observation of other men and their methods were the antidote for stagnation in this regard. In the words of William Osler a quinquennial brain dusting was desirable.

During a recent trip abroad he had spent some weeks in Paris and London and had taken the opportunity of visiting some of the larger hospitals and clinics and of making some observations of different surgeons and their work. He would strongly advise any of those present who thought of visiting Paris to go straight to the *École de Médecine* where they had only to mention the partiular branch of medicine in which they were interested and they would be presented with a printed slip containing the necessary information to enable them to locate readily the man at work.

Being interested more particularly in gynæcology he had naturally confined his attention to those surgeons who practised that subject wholly or in part and amongst the number were de Martel, Pauchet, Faure Duval, Gosset, Hartman, Launy, Schwartz, Auvray, names familiar to them all.

In Paris, as in other Continental cities, many surgeons had their own clinics and thanks to the kindness of the surgeons attached he had seen much interesting work there.

The majority of the large hospitals were old and much over-crowded and lacked the bright, airy appearance to which they were accustomed in Australia. The American citizens in Paris, however, had erected as a war memorial a large hospital and naturally it would have everything of the best. Dr. de Martel had been appointed as the senior surgeon and he would make of it a hospital worth visiting.

On entering any of the operating theatres a visitor was immediately struck with the excellent lighting arrangements. It was most efficient but not costly and in some of the theatres natural light was completely shut out. In practically every theatre the scialytique was found. This was the invention of a medical student. This lamp of three thousand candle power was dome-shaped and was lined inside with numerous reflectors and from the centre a single 100-Watt electric bulb surrounded by a strong lens was suspended. The whole affair could be lowered or raised, moved forwards or backwards and if necessary tilted at any angle. No shadow was cast and the view of the field of operation was perfect.

The operating tables generally were excellent and much superior to those in use in Sydney. The table of Flicotaux especially had a very solid base and was adaptable to any position for any operation.

At the *Hôpital St. Michel* visitors were accommodated in the gallery of the operating theatre and had to look down through the glass roof. Only the surgeon and his assistants were allowed in the theatre. Dr. Robertson could not say whether results were better because of this. Luckily opera glasses were provided and were of great assistance. These glasses were used a lot abroad and he thought their use should be encouraged, as not only did they give a better view, but helped the student to concentrate.

In regard to anæsthetics local and spinal forms of anæsthesia were greatly in vogue. Ether and spinal anæsthesia were combined especially for abdominal work. Pauchet used splanchnic with local anæsthesia to the abdominal wall in his abdominal operations. Quite a number of surgeons had a blood pressure apparatus attached and the blood pressure was regularly noted.

Dr. de Martel of whose work he had seen most, was an excellent operator and most versatile surgeon. His technique was very good and Dr. Robertson doubted whether he had ever seen better. He did not believe in scrubbing his hands with soap before the operation, but preferred to soak them in an iodine solution and then washing them with spirit, thus fixing and hardening any germs which might be present on the hands. It was a pleasure to see him operating on the skull. Local anæsthesia was used. The patient sat in a chair with the head resting on a support. Clamps were applied to the edges of the wound. The scalp was thrown back and the opening in the cranium was made by an electrically driven trephine. Immediately the skull was punctured the power was automatically cut off, owing to the loss of any counter resistance. It was all so simple and it was quite impossible to injure the structures under the bone. After doing this de Martel inserted his cutting trephine and Dr. Robertson had seen him remove a portion of skull three and a half inches square in one and a half minutes. He closed the wound with continuous silk suture as the clamps were being removed.

In old inflammatory and malignant stomach conditions de Martel did very extensive resections, at times transplanting the common bile duct. For the mid-line incision above the umbilicus he used through and through bronze wire sutures when closing the wound. Operations in the gall bladder region were performed with the patient in the reversed Trendelenburg position. The incision was transverse, going right through the abdominal wall. It was closed by a double row of strong interrupted sutures.

In doing an appendicectomy he did not pass a finger into the abdomen, but picked up the bowel with the special triangular forceps of Duval. The stump was cauterized and no attempt was made to bury it.

For mid-line incisions in the lower part of the abdomen Mazarin's modification of Doyen's retractor was used. It was self-retaining and gave a very good exposure of the pelvis. If the incision was carried high up, the laparostat of Dartique was inserted in the upper end of the wound.

In doing hysterectomies the anterior wall of the broad ligament was opened early, the artery was caught with Faure's forceps. Ligatures on needles were passed above and below the forceps and the end of the upper ligature was then brought round the proximal part of the broad ligament, round ligament *et cetera* and tied. The ends were then used as tractors on the uterus so that crushing or tearing of that organ was avoided.

Dr. de Martel had kindly arranged with Gaumont et Companie to show him a film in natural colours of this operation also a gastro-jejunostomy being performed by de Martel. The colouring was perfect and remained so when the cinematograph was stationary. This was an excellent arrangement for demonstration purposes, but he feared rather costly.

Pauchet was another brilliant surgeon, fearless and radical, especially in his gastric work. He was very strict in regard to asepsis. He used splanchnic anæsthesia and worked in a glass house. At Faure's clinic the first assistant always discussed the case before operation, bringing forward the main symptoms and at the same time he sketched on a board the anatomical relations of the tumour. This was reminiscent of the late J. B. Murphy with the exception of the poor house surgeon being pulled to pieces for the benefit of the visitors' knowledge.

There were many others, but Dr. Robertson could not refer to them all. The average French surgeon was inclined to use drainage still, even for twenty-four hours.

Faure after a Wertheim operation still drained by the Mikulicz method. Reverdin's needles or some modification were universally used and Dr. Robertson noticed in London that the Bonney school were doing the same. In the newer types the needle could be adjusted to different positions, a great advantage when working deep in the pelvis or in the upper vaginal region.

Dr. Robertson then turned his attention to London. He said that in London the gynæcologist kept to gynæcology, but he had restricted his visits to Bonney, Berkeley, Rivett Lockyer and Russell Andrews. In preparing the patient for operation the three former had the abdominal wall and

external genitals painted with a solution of 0·5% crystal violet and 0·5% brilliant green in equal parts of spirits and water. The vagina was packed with gauze soaked in the lotion. Needless to say the stain was very penetrating and usually took some weeks to disappear. It had high germicidal powers and owing to small quantities required was cheap. Bonney held that his results more especially in Wertheim's operation, had been better since using this solution. In doin Wertheim's operation he practically removed the whole of the vagina.

These surgeons were also using dark green calico towels for covering the patient while operating. They found the colour more restful to the eyes, especially when many operations were performed. Here the same method of traction on the uterus was used as noted in Paris.

What impressed him most whilst in London was the importance of endometrioma and myomectomy. He was fortunate in seeing Russell Andrews operate on a number of patients in whom he had diagnosed endometrioma and as the result of his observations since then Dr. Robertson was quite convinced that it was a much more common factor in gynæcological conditions than was realized, especially when pelvic pain (dysmenorrhœa) occurred in women of thirty years and upwards who previously had not suffered in this respect. As it was only in a few cases that any gross enlargement was found on physical examination it behoved them to be not only careful in such examination, but to pay particular attention to the contents of the pelvis when doing a laparotomy.

He was sure that all had seen patients with the adhesions and chocolate cavities that Bailey had so aptly described. As he had already stated little might be made out on examination beyond some thickening and tenderness. The most important symptom was the pain which was periodic and associated with the menstrual period.

Bailey was of the opinion that the condition arose as the result of a regurgitation of endometrial cells along the Fallopian tube and so on to the ovary and other organs of the lower part of the abdomen. These cells seemed to have a remarkable power of invasion, but whether all such cells had this power was unknown. If such were the case they should expect to find many more women suffering from this condition. On microscopical examination the mass was wedge shaped, the apex being deep in the ovary or other organ and consisting of endometrial and stroma cells. These were governed by the same laws as the uterine endometrium. They menstruated and hence the dark chocolate coloured material was found. As a rule many adhesions were found and these at times had a dark bloodstained appearance.

Jacobsen had transplanted endometrial tissue into the ovary in rabbits and had been able to produce an adenomatous cyst.

Lockyer believed that the basis of an adenomyoma was epithelial hypertrophy and invasion and that the myomatous tissue was there simply because the infiltration took place into a structure containing muscle.

Dr. Robertson then referred to the patient with periodic pain behind the scar after an abdominal fixation. Lemon and Mahle, of the Mayo Clinic, had operated upon nine such patients and on microscopical examination of the scar tissue, endometrial cells with non-striped muscle fibres had been found in all cases. The uterine mucosa had evidently been transplanted into the abdominal wall by the needle and suture. In performing an abdominal fixation care should be exercised in passing the stitch through the uterus, otherwise this painful condition might be caused. Von Franque held that the infiltration was the result of some previous inflammation and that granulation tissue and areas of round celled infiltration were permeable to benign invading epithelium.

Herly suggested that the adenomyoma of the pouch of Douglas and recto-vaginal area was the result of the mechanical implantation of uterine glands in a vaginal laceration during a high forceps operation in previous years.

Bailey considered that endometrial transplants in the Fallopian tube were the cause of ectopic gestation.

Sampson had found endometrial tissue in sixty-four out of three hundred and twenty-two abdominal operations for pelvic conditions and he considered that these deposits when in the ovary might be a source of some of the adenocarcinomata of that organ, as many of these had the same histological structure as adenocarcinoma in the body of the uterus.

In seven out of sixteen cases of ovarian carcinoma, studied without any evidence of cancer of the body of the uterus, benign endometrial-like tissue in the ovary was found bearing the case histological relationship to the malignant growth that the benign uterine mucosa bore to the adenocarcinoma arising in the body of the uterus. The carcinoma had either arisen in the tissue or was invading it from another source. In all seven instances the histological structure of the carcinoma was similar to that found in some cancers of the body of the uterus.

Donald, of Manchester, in a survey of one hundred and eight cases of endometrioma from six gynæcologists during the previous four years had found that sixteen patients were under thirty years of age, forty-six patients were between thirty and forty years of age, forty-six patients were over forty years of age, ninety-three were married, thirty-seven were nulliparous, twenty-two had one child. The others had more than one child. Dysmenorrhœa was present in 70% of the patients, menorrhagia was present in 57%, fibroids were present in 26%, tarry cysts were present in 77%, adenomyoma of the rectal space was present in 63%, the rectum was adherent in 76%.

The treatment adopted by Donald had been panhysterectomy with removal of appendages in fifty cases supravaginal hysterectomy with removal of appendages in thirty-five cases. For other conditions partial dissection was carried out with removal of the ovary or the ovary alone was removed. The deaths had numbered one.

The operation of myomectomy seemed to have come into its own and since the introduction by Bonney of his myomectomy clamp it was an easier and safe operation. In applying the clamp care should be taken to catch hold of the round ligaments. When this instrument could be applied, the operation was practically bloodless and it was amazing the number of fibroids which could be removed from one uterus. Bonney probably held the record. Dr. Robertson had seen eighty fibroids which Bonney had just removed from one uterus.

The great point in operating was to close thoroughly all dead spaces and to pay particular attention to the line of incision. If possible it should lie anteriorly, failing this, it should be covered with an omental graft to prevent intestinal adhesions. It should always be remembered that free blood in the peritoneal cavity might lead to adhesions. The uterus should be thoroughly palpated, otherwise a small growth might be missed and if in doubt the surgeon should open the uterus and curette the endometrium.

In regard to recurrence Bonney had never found it necessary to operate a second time, owing probably to the thorough manner in which he explored the uterus. The Mayo brothers in a series of five hundred and four patients had only five who eventually needed hysterectomy. Recurrence was more common after radiation and the scope was limited. Pregnancy had occurred in 26% of women who could have had children (Giles).

The contraindications were profound anæmia and coexisting disease of the tubes and ovaries. Degeneration did not appear to be a contraindication. The operation was indicated during pregnancy when the tumour was rapidly growing, also when there was a possibility of it interfering with labour. The main risk was intestinal obstruction from adhesions resulting from oozing around the surface of the wound.

In Bonney's new series of one hundred and twenty cases of myomectomy in the last three years one tumour had been present in seventy-four cases. In the remainder the tumours had been multiple, the greatest number being eighty. Three deaths had occurred.

In the first series of one hundred cases there had been two deaths, so that in all he had operated two hundred and twenty times with a death rate of 2·2%. This was practically the same as he had had in subtotal hysterectomy.

Giles had had experience of two hundred and three cases with three deaths, but he did not operate after the patient

was forty years of age, as the death rate was inclined to be higher.

Since his return Dr. Robertson had performed myomectomy in twelve cases. The largest number of fibroids removed from the one uterus was eight, varying in size from a walnut to that of a large orange. In another case he had removed five tumours. This patient had also had an endometrioma on the anterior wall of the left broad ligament. She gave a history of intermittent pain for some months prior to the operation. All the patients had done well.

In concluding his remarks Dr. Robertson said that the medical profession was an international fellowship and with the easy means of communication in vogue no very great differences were noticeable in the methods of its members in the large cities of the world. Still, however, there were often little points to be picked up by observing the work of others, by so doing men would improve their own methods and would bring an added interest to their work.

Australian hospitals compared favourably with the majority, but he could not help thinking that in so young and prosperous a country as Australia, they should have the best both in buildings and equipment. He feared that they had not. It was in winter when the evenings crept in that they realized how poor the lighting arrangements were and felt that the scialytique could be introduced with advantage. Australian operating tables did not come up to the standard used abroad. All large general hospitals should be provided with de Martel's electrically driven trephine for cranial work.

The standard of Australian nursing was very high.

In the matter of anæsthesia Dr. Robertson confessed to a leaning towards ether administered by the Lidwill or some such apparatus. There could be no doubt that in an extensive Wertheim operation the combination with spinal anæsthesia must prevent after-shock. He did not think local anæsthesia was used as much in Sydney as it should be.

The object of his paper that evening was to try to stimulate the interest of men doing pelvic operations, in endometrioma and myomectomy. Gynæcologists were realizing that knowledge of the endometrium had been all too vague and treatment far from ideal. At last they were beginning to differentiate between the infected and the hyperplastic endometrium. Was the ovary or some portion of it the cause of the hyperplasia, and was it from the hyperplastic endometrium that the straying or wandering cells arose?

Endometrioma especially opened up a big field for observation. He thought the majority was satisfied that the condition was real. Did it originate from straying endomentrial cells or was it the result of a serosal inclusion or again from some Wolffian or Mullerian rest?

Did the recto-vaginal growth and the malignant growth in the ovary arise from these straying endometrial cells?

It was all very interesting. This much was known. Women with pelvic pain arising late in life could be relieved of such pain, if in examination of the pelvic contents anything in the nature of the tarry cavities of Bailey were found and removed.

As to myomectomy it was quite unnecessary for him to dilate upon the advantages of allowing a woman during the child-bearing age to retain her uterus. When they found than 26% of women who could have borne children, had done so, that in itself was one great reason why they should do myomectomy instead of a subtotal hysterectomy.

Endometrioma.

DR. R. DAVIES reported a case of wandering endometrioma. This account will be published in a subsequent issue.

The Scar in Cæsarean Section.

DR. CONSTANCE D'ARCY read a paper on the scar in Cæsarean section and reported two cases of rupture of the uterus. This will be published in a subsequent issue.

NOMINATIONS AND ELECTIONS.

THE undermentioned have been nominated for election as members of the New South Wales Branch of the British Medical Association:

Letters, Napoleon Ignatius, M.B., Ch.M., 1924 (Univ. Sydney), Burrinjuck, *viâ* Goondah.
Stocks, Alfred William John, M.B., Ch.M., 1926 (Univ. Sydney), Kerrisdale, Wahroonga.

THE undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

Duggan, Archibald Roxburgh Hunt, M.B., Ch.M., 1924 (Univ. Sydney), Sydney Hospital.
Fraser, Louie Mansel, M.B., Ch.M., 1926 (Univ. Sydney), c.o. C. MacKenzie, Esq., Molesworth Street, Lismore.
Glasson, Robert Malcolm, M.B., Ch.M., 1925 (Univ. Sydney), The Raymond, Elizabeth Bay.
Jabour, Louis, M.B., Ch.M., 1926 (Univ. Sydney), Lakemba and Alice Streets, Lakemba.
Maxwell, Duncan Struan, M.C., M.B., 1925 (Univ. Sydney), c.o. Mr. Justice Sly, Woollahra Point.
Potiris, Michael, M.B., Ch.M., 1926 (Univ. Sydney), 70, Cook Road, Centennial Park.
Roberts, Frederick Gregory, M.B., Ch.M., 1926 (Univ. Sydney), South Sydney Women's Hospital, Newtown.
Shappere, Arthur Joseph, M.B., Ch.M., 1926 (Univ. Sydney), Hilltop Crescent, Manly.
Sim, Cecil Rhodes, M.B., Ch.M., 1926 (Univ. Sydney), St. George District Hospital, Kogarah.
Spearman, Horace Layton, M.B., Ch.M., 1925 (Univ. Sydney), Coast Hospital, Little Bay.
Staples, Eric Hope, M.B., Ch.M., 1926 (Univ. Sydney), Bundarra Road, Bellevue Hill.
Wilson, Gerald Barry Wilson, M.B., Ch.M., 1926 (Univ. Sydney), c.o. Dr. Ulick Bourke, Hamilton.
Worrall, Ralph Lyndal, M.B., Ch.M., 1926 (Univ. Sydney), Birtley Place, Elizabeth Bay.

THE undermentioned have been elected members of the Victorian Branch of the British Medical Association:

Allan, Raymond Tennyson, M.B., B.S., 1926 (Univ. Melbourne), Caulfield.
Bosschart, Louisa Arendina, M.B., B.S., 1926 (Univ. Melbourne), Malvern.
Brauer, Alfred Ernest, M.B., B.S., 1926 (Univ. Melbourne), Toorak.
Buttsworth, Bert Wilfred, M.B., B.S., 1926 (Univ. Melbourne), Melbourne Hospital.
Callagher, Hugh Charles, M.B., B.S., 1926 (Univ. Melbourne), Melbourne Hospital.
Cook, Vera, M.B., B.S., 1926 (Univ. Melbourne), Albert Park.
Cornford, William Henry Hall, M.B., B.S., 1926 (Univ. Melbourne), Hawthorn.
Davey, Edgar Livingstone, M.B., B.S., 1926 (Univ. Melbourne), Malvern.
Davies, Dora Seymour, M.B., B.S., 1926 (Univ. Melbourne), South Yarra.
Edgar, Arthur Hall, L.R.C.P. *et* S. (Edinburgh), L.R.F.P.S. (Glasgow), 1926, Toorak.
Elphinstone, John Stuart Foster, M.B., B.S., 1926 (Univ. Melbourne), East Melbourne.
Farrell, William George, M.B., B.S., 1926 (Univ. Melbourne), Moonee Ponds.
Freedman, John Nathaniel, M.B., B.S., 1926 (Univ. Melbourne), Medical Society Hall, East Melbourne.
Grounds, Arthur Edwin Ernest, M.B., B.S., 1926 (Univ. Melbourne), Elwood.
Ham, Harold John, M.B., B.S., 1926 (Univ. Melbourne), Kew.
Joel, Louis, M.B., B.S., 1926 (Univ. Melbourne), North Carlton.

Kelly, Henry Patrick, M.B., B.S., 1926 (Univ. Melbourne), Sandringham.
Kirkland, Bruce, M.B., B.S., 1925 (Univ. Melbourne), Caulfield.
Lincoln, Alexander Edward, M.B., B.S., 1926 (Univ. Melbourne), Ballarat Hospital.
Lovett, Lyal Longhurst, M.B., B.S., 1926 (Univ. Melbourne), Kew.
MacFarlane, Kenneth Horton, M.B., B.S., 1926 (Univ. Melbourne), Canterbury.
Martin, Walter Raymond, M.B., B.S., 1926 (Univ. Melbourne), Preston.
Murphy, Aileen Mary, M.B., B.S., 1926 (Univ. Melbourne), Parkville.
Radich, John Peter, M.B., B.S., 1926 (Univ. Melbourne), St. Kilda.
Simpson, Jessie Baird, M.B., B.S., 1926 (Univ. Melbourne), Sandringham.
Taylor, Stuart Gifford, M.B.. B.S., 1926 (Univ. Melbourne), Armadale.
Welch, Edwin Stewart, M.B., B.S., 1926 (Univ. Melbourne), Toorak.

Medical Societies.

THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA.

A MEETING OF THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA was held at the University of Adelaide on October 1, 1926.

Scapular Types.

DR. A. A. LENDON drew attention to the subject of a Henderson Lecture delivered at the University of Edinburgh in 1925 by an American, Dr. W. W. Graves, Professor and Director of Mental and Nervous Diseases, St. Louis Unit. The title of the lecture was "The Relation of Shoulder-blade Types to Problems of Mental and Physical Adaptability."

Dr. Graves's thesis was as follows: That bones largely preserve their individual characters from birth to the grave. Twenty years previously he had discovered that scapulæ differed in type: whilst most text-books described the vertebral border as being convex, he found that there were other types, both straight and even concave. Dr. Graves found these varieties not only in all races ancient and modern, but even in anthropoid apes. He stated that by the tenth week of intra-uterine life the scapula had attained its essential form.

In the examination of 6,000 skeletons he found that in the young the "scaphoid" or concave variety was frequently met with; but that in the old the reverse obtained. Thus: up to the tenth year 80% of scapular borders were scaphoid or straight and 20% convex; between the fortieth and fiftieth years 50% of scapular borders were scaphoid or straight and 50% convex; between the seventieth and eightieth years 20% of scapular borders were scaphoid or straight and 80% convex. What were the possible explanations? Dr. Graves asked: Could the scaphoid variety of early life pass into the convex form of old age, either naturally by senescence, or artificially by environmental influences? Seeing that the figures held good for the chimpanzee, he doubted whether environment could have any influence, nor was there any biological reason why all human beings should have the same type. Probably the type was fixed in early life: certainly, as a rule, the type was transmitted constantly. The only remaining influence, Dr. Graves alleged, was that there was greater mortality at all ages of persons with the scaphoid type of scapula.

Those concerned with life assurance assessments were naturally "intrigued" with the idea and an abstract of the article had appeared in an insurance journal (*The Spectator*, February 18, 1926), and in *The British Medical Journal*, October 24, 1925. They foresaw a possible additional method of estimating the probable duration of life.

DR. R. HONE suggested that it might be reasonable to suppose that the outline of the scapula changed during the life of the individual, becoming more convex as the individual grew older. This explanation suggested itself because the scapula formed the attachment of very large and powerful muscles.

DR. L. V. BULL stated that even though growth had normally been completed, changes in the form of bone could still occur owing to traction. Dr. Bull inquired also whether there was a sufficient mortality between the tenth and the fortieth years of age to convert a proportion of convex scapulæ among the population from 20% to 50%. Even supposing all those persons with convex scapulæ survived and mortality occurred exclusively among those with concave scapulæ, it would appear that a group formerly constituting at ten years of age only 20% of the population, must constitute 50% of the survivors. This would appear to require a mortality of 60% of the population between these ages even if no mortality occurred at all among those possessed of convex scapulæ.

PROFESSOR T. BRAILSFORD ROBERTSON pointed out that Dr. Graves's argument that environment could not be responsible for the change in the proportion of the two types of scapulæ because chimpanzees showed the same change, was a fallacious one, since the environment of the scapulæ was largely determined by the use of the muscles attached to it and the chimpanzee did not use these muscles to a less extent than the human being.

Erythema Nodosum.

Dr. A. A. LENDON said that during the last century *erythema nodosum* had been generally looked upon as a form of rheumatism. As long ago as 1890 he had brought forward evidence in suppport of its being really a specific infectious disease, which he termed "Nodal Fever." For the last quarter of a century there had been an increasing tendency to consider it as a manifestation of tuberculosis. In the *Journal of the Royal Army Medical Corps* for July Colonel J. C. Kennedy suggested a new theory, based upon the observation of four cases of meningococcus septicæmia —in Colonel Kennedy's words: "Given a case of *erythema nodosum*, suspect meningococcus infection."

PROFESSOR J. B. CLELAND suggested a possible connexion between the organism causing *erythema nodosum* and the typhus group of organisms.

DR. J. G. SLEEMAN stated that he observed eighteen patients with *erythema nodosum;* none of them had manifested any meningeal infection; only one had developed a sore throat with blood and albumin in the urine.

Artificial Polyuria in Rats.

DR. C. S. HICKS described on behalf of himself and Mr. M. L. Mitchell an experiment on artificially induced polyuria in rats. The animals had been subjects of continuous experiment for four months, the excess ingestion of water being voluntary and because of the diet containing 17% sodium chloride. The urinary volume per rat had reached as high a figure as 150 cubic centimetres per twenty-four hours. There was no disturbance in the ratio of nitrogen chlorine excretion and within twenty-four hours of ceasing the excess salt intake, the urinary volume had fallen to normal (five cubic centimetres per twenty-four hours). These facts indicated a wide degree of compensation for the excess secretion on the part of the kidney and histological examination showed that the statement of Needham that a polyuria of two months' duration quite disorganized the organ, was inaccurate. There was evidence in favour of an upset in the ammonia excretion, an increase being noted, the blood ammonia at the height of the polyuria being four times normal, namely, 0.24 milligramme per cubic centimetre of blood. The liver had been large (twice the normal weight) and friable and the portal system and renal vessels hyperæmic. The disposition of granules in the cells of the convoluted tubules illustrated Cushny's theory of reabsorption by this channel. Microphotographs were exhibited.

PROFESSOR J. A. PRESCOTT inquired whether the varying consumption of salt among the different races of mankind might not be in part attributable to differences of climatic conditions? In a warm climate profuse perspiration would occur and it had been shown that the loss of sodium

chloride from the tissues consequent upon excessive perspiration might be so considerable as to lead to the condition known as "miner's cramp." In a warm climate, therefore, the desire for salt might be more urgent than in a cold climate under the same dietary conditions.

DR. H. S. NEWLAND said that the intravenous injection of hypertonic saline solution caused shrinkage of the volume of the brain and that practical use of this had been made in operations upon the pituitary because the shrinkage of the brain allowed easier access to this region.

PROFESSOR J. B. CLELAND suggested the employment of hypertonic saline solution in lobar-pneumonia where chlorides were reduced in the urine.

DR. G. BROWN stated that it was possible to reduce *hernia cerebri* by rectal transfusion of hypertonic saline solution.

Pathological Specimens.

PROFESSOR J. B. CLELAND exhibited the uterus removed after the fatal termination of a three and a half months' pregnancy due to hæmorrhage consequent upon spontaneous rupture of the uterine wall. There was no evidence of any kind of mechanical interference. The rupture appeared to be genuinely due to weakness of the uterine wall. It was a case of *placenta prævia*. The lungs of the same subject were also exhibited. The patient had lived all her life in Eyre's Peninsula, far from the carbon-laden atmosphere of cities. The lung tissue was extraordinarily free from carbon particles, the only visible deposits being in the apices of the lungs. Professor Cleland suggested that the comparative stasis of air in this portion of the lung situated above the squeezing effect of the ribs permitted residence of particles there for a sufficient period to allow of ingestion by phagocytes and to the same cause he would attribute the tendency for tuberculous infection to occur initially in this region of the lung.

Correspondence.

PROPRIETARY MEDICINES.

The following letter has been forwarded for publication from the Honorary Secretary of the New South Wales Branch of the British Medical Association:

Pharmaceutical Society of New South Wales.
7 Richmond Terrace,
Domain, Sydney,
November 18, 1926.

The Secretary,
British Medical Association.

SIR: I will deeply appreciate your courtesy if you will kindly place the following facts before your members, preferably through your excellent journal.

There is a tendency on the part of physicians nowadays, when prescribing a proprietary medicine for their patients, to advise them of the wholesale cost of such medicine, and to tell them that the preparation should not cost them more than so and so at the chemist's. This practice is very unfair to the chemist, and often prevents him from obtaining a legitimate profit, because the physician's suggested price is frequently based on figures which are erroneous.

For instance. Although it may not be known to your members, most proprietary preparations have three distinct prices: (*a*) the manufacturer's price to the physician, (*b*) the manufacturer's price to the wholesaler, (*c*) the wholesaler's price to the chemist. Consequently, when the physician mentally adds a couple of shillings to the price of the article to him, and fixes that as the selling price to the patient, it often follows that the chemist is left without any profit at all, unless he tells the patient that the physician is wrong, which is hardly the correct thing to do, as it sometimes lessens the confidence felt by the patient in his medical adviser.

Moreover. The dispensing department is by no means the most profitable part of a modern pharmacy, because it has to carry the largest proportion of the overhead expenses of the business, and this overhead is largely increased by the amount of capital tied up in proprietary preparations. A physician, for example, prescribes four ounces of Blank's Compound Syrup, possibly to try out the preparation. To fill the prescription, the pharmacist has to purchase a one pound bottle, costing, say, eight shillings. He charges the patient three shillings for the mixture, this representing the 50% he is allowed by the Master Pharmacists' Association, but he will almost certainly remain out of pocket on the transaction, for the mixture may only be repeated once, if at all. The shelves of the average pharmacist are full of half-used bottles which have been tried once by the physician and then abandoned.

Cases have also been brought before my notice when physicians have recommended their patients not to go to a chemist, as they will be overcharged, but to go direct to the agents for some certain line and have their prescription filled there. This must be considered as unprofessional conduct, and in any case it only creates a distrust of the chemist without doing the patient any good, as the same price is charged by the agent as would be charged by the chemist.

However, all I beg to ask at present is that physicians will consider the rights of the chemist to a legitimate profit for their work by (*a*) prescribing proprietary medicines, when required, in original containers, where possible, or (*b*) refraining from indicating any price when original quantities are not prescribed.

Thanking you for your cooperation in this matter.

I am, Sir, yours faithfully,
(Sgd.) L. INGAMELLS, President.

"QUACKERY."

SIR: Dr. Vallack challenges me to prove that adrenalin, pituitrin and insulin, have any effects if swallowed. He chooses these drugs made for hypodermic use and would condemn all on the failure of these to act if introduced into the stomach.

The substance traded as "Insulin" if swallowed has no effect, but feeding with raw pancreas will free a diabetic urine from sugar and will greatly lower the blood sugar (*vide* paper by Dr. Hollins, *The British Medical Journal*, March 14, 1925). Is this result not brought about by the active principle of the gland or insulin?

Adrenalin will show some of its characteristic actions if given by the mouth. To meet this reply, I gave to a patient who had previously given a well marked Goetsch reaction, one cubic centimetre of 1 in 1,000 adrenalin per mouth and took his blood pressure every ten minutes for one hour and tested for sugar each sample of urine passed for the next five hours. There was a rise of blood pressure within ten minutes, which continued for twenty minutes. The systolic pressure rose six millimetres of mercury, the diastolic twelve millimetres of mercury. There was a diuretic reaction and in specimens of urine passed, one hour, three hours and three and a half hours after taking the adrenalin, there was a glycosuric reaction. This was most pronounced in the three-hour specimen.

Dr. Vallack invites me to try pituitrin upon a dog. Pituitrin is a drug of many actions and which and what he wishes demonstrated upon a dog, I do not know. Its chief actions are oxytoxic, pressure and colonic. Knaus, using cats, has proved the first action by absorption from the mouth, so there is no need to bother the stomach. Carnet and Terris have shown the colonic action following ingestion. The pressure effect is not observed if introduced into any part of alimentary tract (Knaus).

Taking the gland as a whole there are other and very definite actions. There is its influence upon growth, sexual development and activity and carbohydrate metabolism, all of which may be defined and clearly affected by giving anterior pituitary by the mouth.

To avoid detail I would mention the action of anterior pituitary upon the growth of tadpoles and draw attention to a paper in *The Lancet* of July 31, 1926, by Gardiner Hill and Forest Smith, on feeding anterior pituitary to children.

Dr. Vallack protests against the use of tablets of brain, spleen, prostate and testicle. This is hardly just to the endocrinologist, as the first is not an endocrine organ and it is clear that Dr. Vallack thinks that the endocrinologist has but little brain and uses less. It is doubtful if the next two have an hormone secretion. Secretions from his fourth item are universally acknowledged to be active and are a great asset to the surgeon and obstetrician.

Dr. Vallack's remarks about surgeons and appendices are extremely painful reading.

Yours, etc.,

GUY P. U. PRIOR.

Mental Hospital, Parramatta,
January, 21, 1927.

QUININE TOLERANCE IN PREGNANCY.

SIR: I have recently been consulted by three pregnant women from the tropics who have been taking quinine sulphate grains V. *per diem* as a prophylactic and grains XX. in one dose for occasional attacks of "fever." Of the three two have each had two full term confinements and one has had two miscarriages, but this interesting observation is discounted by the disclosure that both were due to instrumental interference in the tropics. The other woman is four months pregnant and has had irregular bleeding since conception. She had been advised by a practitioner of extensive tropical experience to continue taking quinine. I found no physical condition to account for the bleeding and quinine suggests itself as a possible cause, but my ignorance of tropical practice did not justify an expression of opinion.

As there is now quite a little exodus of settlers to New Guinea and its neighbourhood, I think it would be a kindness if a correspondent with tropical experience would contribute a note on this matter.

I tried to induce labour at full term for one of these patients, but quinine and castor oil given in the routine way had no effect.

Yours, etc.,

K. ST. V. W.

December 23, 1926.

CANCER RESEARCH.

SIR: The recent magnificent response to the public appeal of the New South Wales Cancer Research Committee has focussed attention on that body and lively hopes have been aroused that through its activities some real contribution may be made to the solution of the cancer problem either in regard to the ætiology of the disease or by the elaboration of successful curative measures. It may be stating a truism to assert that these hopes will not be realized unless the Committee approaches its task from the widest possible angle collecting and correlating not only all available data bearing on the incidence of cancer in man, but also those relating to cancer in the lower animals and analogous forms in plants. That there is a considerable fund of information available from these sources, some of it possibly of special interest and significance as throwing light on causes of variations in the incidence of cancer in Australia is readily demonstrable.

To cite some of the more obvious differences in the incidence of cancer in domesticated animals and man in Australia we have, in addition to the well known rarity of gastric cancer in the former, the fact that in the dog epitheliomata and chondro- and osteo-sarcomata are relatively common, while in the horse there appears to be an undue preponderance of cancer of the external genitalia and the frequency of cancer of the eye and orbit in this animal is but too well known to every veterinarian.

Another interesting aspect of cancer incidence in the lower animals is the frequent association of cancer with parasitic infestation. Since the first demonstration by Fibiger of the part played by *Gongylonema neoplasticum* in the causation of gastric carcinoma in the rat, it has been found that *Cysticercus fasciolaris*, the strobilate larval form of *Tænia tæniaformis*, may cause primary hepatic cancer in the same animal. Again it would appear that *Hepaticola gastrica* must now be implicated as a cause of gastric cancer in the rat while another nematode, *Trichosomoides crassicauda*, is found associated with cancer of the bladder in this unfortunate rodent. In Australia habronema larvæ have been shown by Bull and Seddon to give rise to granulomatous growths of the conjunctiva and external genitalia and it is possible that these larvæ may in some degree account for the frequence of occurrence of true malignant growths on these sites. In support of this hypothesis we have the recent record by Le Soeuf and Weston of an epithelioma of the stomach of the horse thought to be caused by *Habronema megastoma*.

That parasites may also be responsible for bringing about the damaging or lowering of resistance of tissues, thus facilitating the entry and multiplication of the "virus" of cancer in man, has been suggested by Sambon who cites the frequence of occurrence of cancer of the bladder in association with infestation with *Schistosomum hæmatobium* in Africa and of primary hepatic cancer associated with infestation with *Schistosomum japonicum*, *Opisthorcis felineus* and *Clonorchis sinensis* in China and Japan.

In regard to the importance of the contribution which plant pathologists may make to the elucidation of cancer it is only necessary to mention the work of Erwen Smith in demonstrating the part played by *Bacterium tumifaciens* in the ætiology of so-called plant cancer and the recent striking claims by Blumenthal of the part played by the same organism in the production of cancer in man. That cancer is definitely not a problem affecting and of interest to man alone, but one common to the whole animal kingdom and possibly even to plants, is sufficient justification for the demand that we should not regard the problem of its solution as one appertaining to the medical profession alone, but also to workers in other, but closely allied fields of science.

In the light of the above facts it is perhaps not too much to hope that even at this stage the Cancer Research Committee may realize the advisability of coopting both veterinary and plant pathologists as those best qualified to advise in regard to these important aspects of its work and without whose cooperation the attainment of the desired goal will be made more difficult of achievement.

Yours, etc.,

I. CLUNIES ROSS.

The Veterinary School,
The University of Sydney,
January 12, 1927.

A MATTER OF GREEK.

SIR: I thank Dr. Jeffrey for correcting in your issue of January 29 my careless error. φωνεῖν is transmissive, not receptive, of sound and so to telephone is to speak afar, not to hear afar; many distressing experiences should have reminded me of this.

His second criticism I do not understand. The hexameter I quoted from Homer says nothing of arrows; they occur in the next. I submit that my translation is permissible, though it makes the most of a rare compliment to a colleague.

Yours, etc.,

GUY GRIFFITHS.

131, Macquarie Street, Sydney,
February 4, 1927.

HYPNOTIC SUGGESTION.

SIR: I was glad to see from the article by Dr. Idris Morgan that my ancient acquaintance—hypnotic suggestion—has not entirely faded into the limbo of the forgotten.

There was a time when the neurological clinics of Europe were all agog at the wonders reported from Paris, Nancy, Amsterdam and Stockholm. The day of scientific faith-healing seemed to have arrived and many were eager to

enter the promised land. But of late this cult has fallen on evil days. The psychoanalysts pour their contempt upon it, the Christian scientists and other fancy religions denounce it as of the devil, and Monsieur Coué and his disciples regard it as a stumbling block rather than an ally in the functioning of suggestion. And yet, looking back over thirty-five years of sporadic indulgence in the art, I can call to mind many cases which responded to this after other forms of more orthodox treatment had failed.

For instance, I have letters from a number of university students alleging that some preliminary treatment had rendered them calm and collected at their crucial examination. Perhaps it was only a *post hoc*, but it is certain that they all passed while some of them had failed several times before. Again, there have been parsons and men with ambitions to become public speakers who shed their nervousness under hypnotism's benign influence. Of course it is open to argument whether one was acting in the public interest in bringing this about.

But my two *pièces de résistance* have been drunkenness and insomnia. One has effected the most striking results in some of these cases. I see some of my patients who twenty years ago or longer looked upon the wine too freely, walking about the streets—reputable citizens. Of course again these may only be "*post hoc*" and they might have arrived at the same destination by their own will power, but I think not. No such doubt can arise in the case of the insomniacs.

If sleeplessness can be cured by hypnotic suggestion, then it is the ideal form of treatment for this hideous complaint. Whenever I hear of a suicide driven to self-slaughter by want of sleep, I lament that I did not have the opportunity of having " a go" at him or her.

Finally, I would say that probably in our early days we claimed too much for this kind of psychotherapy with the resultant reaction. Nevertheless I would advise young practitioners to get a book on the subject and the occasion may arise when in the words of the vulgar song, "You'll be surprised.'"

Yours, etc.,

RICHARD ARTHUR.

211, Macquarie Street, Sydney,
January 21, 1927.

Obituary.

SINCLAIR FINLAY.

WE regret to announce the death of Dr. Sinclair Finlay which occurred at Sydney, on February 2, 1927.

LESLIE JOHN SCOTT.

WE announce with regret the death of Dr. Leslie John Scott which occurred at Balmain, New South Wales, on February 5, 1927.

Books Received.

YOUR BABY: A PRACTICAL GUIDE TO MOTHERS AND NURSES, by Muriel A. Peck, R.V.T.N.A.; Foreword by Vera Scantlebury, M.D.; Edited by Frances Taylor; 1927. Melbourne: Ramsay Publishing Proprietary, Limited. Demy 8vo., pp. 115.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xxii.

THE UNIVERSITY OF MELBOURNE: Director of Tubercular Research.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester United Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members accepting appointments as medical officers of country hospitals in Queensland are advised to submit a copy of their agreement to the Council before signing. Brisbane United Friendly Society Institute. Stannary Hills Hospital.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	Contract Practice Appointments at Ceduna, Murat Bay and other West Coast of South Australia Districts.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia. Yarloop Hospital Fund.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Diary for the Month.

FEB. 15.—Tasmanian Branch, B.M.A.: Council.
FEB. 15.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
FEB. 16.—Western Australian Branch, B.M.A.: Branch.
FEB. 23.—Victorian Branch, B.M.A.: Council.
FEB. 24.—South Australian Branch, B.M.A.: Branch.
FEB. 25.—Queensland Branch, B.M.A.: Council.
MAR. 1.—Tasmanian Branch, B.M.A.: Council.
MAR. 2.—Victorian Branch, B.M.A.: Branch.
MAR. 2.—Western Australian Branch, B.M.A.: Council.
MAR. 3.—South Australian Branch, B.M.A.: Council.
MAR. 4.—Queensland Branch, B.M.A.: Branch.
MAR. 8.—Tasmanian Branch, B.M.A.: Branch.
MAR. 8.—New South Wales Branch, B.M.A.: Ethics Committee.

Editorial Notices.

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